Impact of livestock pricing policies on meat and milk output in selected sub-Saharan African countries

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LED

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1. Introduction

Among the ways in which governments intervene in the livestock sub-sector the most prevalent, and arguably the most important, is interference with prices. Price intervention policies are often implemented with the aim of achieving certain broad objectives which, in developing countries, include output expansion, government revenue generation, improvement of income distribution, stabilisation and inflation control. In pursuing these objectives, governments possess a wide variety of policy instruments which can be manipulated directly to achieve the desired objectives. For example, they can establish price controls or price supports to benefit consumers and producers respectively, or they can impose import duties and export taxes to raise government revenue. In addition to direct measures, indirect forms of government intervention including exchange rate adjustments can also influence the production, consumption and trade of livestock products.

In real practice, sub-Saharan African (SSA) countries have pursued a wide variety of pricing policies, differing in the choice of instruments as well as in their objectives.[1] The effects of these policies on production incentives have also been varied. The multiplicity of objectives and instruments suggests that in some cases conflicts will arise between objectives and policies pursued to achieve them. The likelihood of such conflicts is heightened when, as it often happens, different ministries are interested in different objectives. The ministry of agriculture, for instance, may advocate higher farm prices to encourage output expansion, while the finance ministry may be interested in interventions which raise revenues. In this situation, one of the contributions of price policy research will be to quantify the effects of different policy options in order to permit an informed discussion which can lead to better decision making and an improved incentive system.

1. For this study, sub-Saharan African (SSA) countries are taken to include only those 39 countries listed in ILCA's strategy and long-term plan document (see ILCA, 1987a p. 88).

The broad objective of this study is to review, analyze and present evidence concerning the effects of livestock pricing policies on production incentives in a sample of SSA countries. The specific objectives are:

1. to provide a comparative picture of objectives and policy instruments used by selected SSA countries with respect to the livestock sub-sector and,
2. to estimate the effects of direct and indirect price interventions on incentives, livestock output, consumption, trade and government revenue.

In what follows, the experiences of six SSA countries are profiled. These countries which include Côte d'Ivoire, Ethiopia, Mali, Nigeria, Sudan and Zimbabwe were selected on the basis of their livestock population, production, trade and consumption. Data were collected through interviews with policy makers and livestock marketing officials, and from a wide range of primary and secondary published documents.

To introduce the subsequent discussion, chapter 2 examines the growth and performance of the livestock sub-sector in the study countries. It demonstrates the diversity of situations and experiences with respect to production, consumption, export and import of livestock products.

Chapter 3 considers the multiple objectives of price policies in the selected countries and analyses the principal instruments employed to influence producer and consumer prices. The discussion highlights similarities and diversities in objectives and policies toward the livestock sub-sector and also examines the compatibility of goals with instruments.

The final chapter assesses the impact of government intervention on price incentives and concludes by highlighting the main findings of the study.

2. Livestock production, consumption and trade in the study countries

This chapter sets out to examine the main features of the livestock sub-sector in the selected countries by assessing trends in production, trade and consumption of a few livestock products. The discussion is confined to cattle, sheep and goats (the three ruminant species presently included in ILCA's research agenda) and to the food products (i.e. meat and milk) derived from them. The policy implications of the observed trends are briefly discussed to set the context for the discussion of pricing policy that follows.

The production structure

Although there are many similarities in the livestock production systems of SSA, there are also important variations. Such variations reflect differences in climate, availability of grazing land and incidence of diseases such as trypanosomiasis. For the countries selected for this study, pastoral systems account for the bulk of ruminant livestock production, except in Zimbabwe where cattle ranching and mixed crop-livestock systems are very important. Aggregate meat production and related data for the selected countries are shown in Table 1. The selected countries together account for almost half the total meat production (by weight) in SSA.[2] Per capita meat production varies somewhat, from about 8.5 kilograms per person in Nigeria to 25.3 kilograms per person in Sudan, reflecting substantial differences in population and pastoral resources among the countries considered.

2. The corresponding figure for milk is also about 50% (see Table 2).

Table 1. *Meat production, human population and per capita gross national product in selected countries, 1985.*

Country	Total meat production[1] ('000 tons)	Human population Mid-1985 (millions)	Per capita meat production (kilograms)	Per capita GNP (US$)
Côte d'Ivoire	127	10.1	12.6	660
Ethiopia	556	42.3	13.1	110
Mali	134	7.5	17.9	150
Nigeria	846	99.7	8.5	800
Sudan	553	21.9	25.3	300
Zimbabwe	110	8.4	13.1	680

Total, selected countries	2326	189.9	12.3	
SSA	4875	418.0	11.7	400

1. Relates to meat from different livestock species slaughtered within national boundaries, regardless of their origin (FAO 1986a).

Sources: FAO (1986a) for total meat production data; World Bank (1987) for human population and GNP figures.

Table 2. *Production of livestock products in selected countries, 1983–85.*[1]

Country	Beef and veal	Mutton and lamb	Goat meat	Cow's milk[2]
	('000 tons)			
Côte d'Ivoire	42	6	6	15
Ethiopia	215	86	65	600
Mali	49	20	21	106
Nigeria	239	44	134	348
Sudan	309	92	39	1735
Zimbabwe	72	1	5	196
Total, selected countries	926	249	270	3000
SSA	2037	379	484	6125

1. Annual 1983–85 average.

2. Total production of whole fresh cow's milk.

Source: FAO (1986a) and FAO (1987) for 1983 figures.

Beef accounts for 41% (by weight) of total meat production in the selected countries. It is followed in importance by goat meat (12%) and mutton (11%). Domestic milk production is also important, but Sudan alone accounts for over 50% of total milk production in these countries (Table 2). When products are weighted by equivalent border prices, the value of beef is the highest, followed by milk, mutton and goat meat respectively.

Aggregate meat shares, however, conceal important country variations in production. The share of beef in total meat output varies among countries from 29 to 64%. For goat meat the share is 4 to 16% and for mutton and lamb, 1 to 18%. The share of beef is high and about equal in Sudan

and Zimbabwe despite enormous differences in production systems. Goat meat share is high in Nigeria and Mali but very low in Zimbabwe and Côte d'Ivoire.

Trends in meat and milk production

Per capita meat production levels appear in Table 3. In spite of the limitations of the production data from which these estimates are derived, the ratios do provide an indication of relative change over time. Per capita beef production declined over the period 1971–73 to 1983–85 in all the selected countries, except Sudan. During the 1971–73 to 1977–79 period, only two countries, Mali and Sudan, showed a slight increase in per capita production of goat meat, lamb and mutton though this declined by 1983–85. Total meat production per caput increased modestly in two countries, remained about constant in one and declined in three.

Table 3. *Annual average production of meat by country, selected periods (kg per capita).*

Country	Beef			Sheep and goat meat			All meat		
	1971–3	1977–9	1983–5	1971–3	1977–9	1983–5	1971–3	1977–9	1983–5
Côte d'Ivoire	7.6	4.5	4.3	1.8	1.4	1.2	16.4	13.5	12.8
Ethiopia	8.0	6.8	5.1	5.2	4.3	3.6	18.6	16.5	13.2
Mali	7.4	6.4	7.3	4.6	6.7	6.0	17.9	18.8	18.4
Nigeria	3.1	2.7	2.5	2.0	1.9	1.8	8.2	8.2	8.5
Sudan	9.5	11.2	14.5	5.1	6.7	6.2	19.3	22.4	24.6
Zimbabwe	18.8	14.9	9.5	1.4	1.0	0.6	25.1	20.7	14.8
SSA	5.8	5.6	4.8	2.2	2.3	2.1	12.3	12.3	11.5

Sources: Meat production data from FAO (1987, 1989); Human population data from World Bank Atlas (various years) and FAO (1989).

Per capita milk production also varied from country to country over the 12 year period 1971–73 to 1983–85 (Table 4). In one country, there was a substantial increase in production, while per caput milk production either declined or remained constant in the remaining countries. The underlying causes of these different production performances are varied, but may include natural disasters (e.g. acute recurring droughts) which reduce feed availability, access to external markets and government economic policies. The effects of government economic policies on production incentives are examined in detail in chapter 4.

Table 4. *Annual average production of cow's milk by country, selected periods (kg per capita).*

Country	Per capita cow's milk production		
	1971–3	1977–9	1983–5
Côte d'Ivoire	1.4	1.3	1.5
Ethiopia	20.8	18.6	14.4
Mali	18.7	13.8	13.8
Nigeria	4.5	4.1	3.6
Sudan	47.6	58.2	81.5
Zimbabwe	24.6	21.3	23.6
SSA	16.4	15.9	15.2

Source: Same as Table 3.

The consumption structure

Per capita levels

Table 5 shows the level of meat consumption in the study countries. Total per capita meat consumption in 1983–85 varied from about 9 kilograms to 25 kilograms reflecting differences in meat prices, income, population and agricultural resources among countries.

Except for Mali in recent years, beef is the principal meat consumed in the study countries. Beef accounts for between 54–64% of total meat consumption in Zimbabwe, between 48–59% in Sudan, and between 27–47% in the remaining countries.

Although sheep and goat meat are widely consumed, their relative importance varies among countries. In 1983-85, the share of sheep and goat meat in total meat consumption was 36% in Mali compared with 6% in Zimbabwe. Overall, the meat products considered here together account for more than 50% of the total meat consumed in the study countries.

Table 5. *Annual average apparent consumption of meat[1] by country, selected periods[2] (kg per capita).*

Country	Beef			Sheep and goat meat			All meat		
	1971–3	1977–9	1983–5	1971–3	1977–9	1983–5	1971–3	1977–9	1983–5
Côte d'Ivoire	7.5	7.0	5.5	1.7	1.6	1.3	15.9	15.9	14.5

Ethiopia	7.1	6.8	5.6	5.1	4.4	4.0	17.4	16.4	14.5
Mali	6.7	6.3	4.5	4.2	6.4	5.6	16.4	18.0	15.4
Nigeria	3.3	3.3	2.5	2.1	2.2	1.9	8.7	9.6	9.1
Sudan	10.3	11.1	14.7	5.7	6.7	6.3	21.3	22.6	25.1
Zimbabwe	11.8	6.9	6.6	1.7	1.2	0.7	18.3	12.7	11.4
SSA	6.7	6.6	5.2	2.6	2.5	2.2	14.9	15.2	12.2

1. Apparent consumption of meat, expressed in terms of carcass weight, is obtained from data on slaughtered production and trade in beef, sheep and goat meat (FAO 1985).
2. Figures for 1971–3 and 1977–9 are annual averages based on per caput consumption data from FAO (1985); 1983–5 averages are from ILCA (1987b).
Sources: FAO (1985) and ILCA (1987b).

Per capita milk consumption also differs greatly among countries, from about 8 kilograms liquid milk equivalent (LME) in Nigeria to more than 80 kilograms in Sudan in 1983–85 (Table 6). The wide variation in milk consumption is partly explained by differences in dietary habits. As indicated later on in this chapter, the percentage of total milk consumed that is imported varies from about 5 to 89%, and imports have been rising rapidly in recent years.

Table 6. *Annual average apparent consumption of milk[1] by country, selected periods (kg LME per capita).*

Country	Per caput milk consumption		
	1971–3	1977–9	1983–5
Côte d'Ivoire	11.0	16.6	14.6
Ethiopia	21.1	19.4	17.1
Mali	20.7	17.2	17.2
Nigeria	8.0	11.4	7.8
Sudan	48.6	60.2	85.8
Zimbabwe	26.2	21.6	25.8
SSA	18.9	20.7	20.2

1. Apparent consumption is defined as cow milk production plus net imports of fresh, dried and condensed milk expressed in liquid milk equivalents (LME).
Sources: FAO (1987 and 1989); FAO Trade Yearbooks (various issues); ILCA (1987b) and World Bank Atlas (various years).

Trends in meat and milk consumption

Table 5 shows that between 1971–73 and 1983–85 per capita beef consumption fell in five countries and increased only in one, with the share of beef consumption following the same pattern.

Per capita sheep and goat meat consumption which had risen significantly in Mali and to a lesser extent in Sudan in the 1970s, rose very little in the early 1980s in these two countries. In the remaining countries per capita consumption fell. The share of sheep and goat meat in total meat consumption increased significantly in Mali, but fell in all the other countries.

Per capita consumption of milk rose in the 1970s in Côte d'Ivoire, Nigeria and Sudan (Table 6). While the growth was maintained into the early 1980s in Sudan, it declined in Nigeria and Côte d'Ivoire over the same period. In all other countries, per capita consumption of milk was lower in 1983–85 than in 1971–73.

The annual growth rates of total domestic production and consumption of the livestock products considered here appear in Table 7. While growth rates such as those cited in Table 7 are only rough estimates, it would appear that increases in consumption have exceeded domestic production increases by a substantial amount, particularly for milk. The growing gap between domestic production and consumption is further confirmed by the net trade data presented in the next section.

Table 7. *Estimated annual growth rates of total domestic production and consumption of livestock products by country, 1971–85.*

Product	Country	Production	Consumption
		Per cent	
Beef	Côte d'Ivoire	1.09[a]	2.45
	Ethiopia	0,30	0.90
	Mali	1.93	– 0.35[a]
	Nigeria	2.71	2.71
	Sudan	6.05	5.49
	Zimbabwe	– 2.57	0.30[a]

Sheep and goat meat	Côte d'Ivoire	1.98	2.62
	Ethiopia	1.23	1.23
	Mali	5.44	6.15
	Nigeria	3.28	3.14
	Sudan	3.61	4.01
	Zimbabwe	– 6.24	– 5.40
Cow's milk	Côte d'Ivoire	5.46	8.59
	Ethiopia	1.05	2.43
	Mali	1.71[a]	1.93
	Nigeria	1.83	4.01
	Sudan	7.38	7.70
	Zimbabwe	2.50	2.69

Note: The annual growth rate has been estimated as a log linear trend by ordinary least squares regression.

a. The regression coefficient used to estimate the growth rate was not significant at the 5% level.

Sources: FAO (1987), FAO Trade Yearbook (various issues) and ILCA (1987b).

Patterns of international trade in meat and milk

The diversity of trade in meat and milk in the selected countries is illustrated by the data presented in Tables 8, 9 and 10 for beef, sheep and goat meat and milk respectively. Live animals make up the bulk of meat exports which are directed mostly towards neighbouring African countries. Ethiopia and Sudan export live animals to the Middle East, and Zimbabwe is the only country that exports beef to the EEC under the Lome convention.

With respect to beef, four out of the six countries were net exporters between 1971-73 and 1983-85 (Table 8). Exports, however, declined in three and increased-only in one. The remaining two countries—Côte d'Ivoire and Nigeria—have been net importers, The level of imports in the former has been nearly invariant over the past 15 years, but imports rose significantly in the latter.

Table 9 shows that Sudan, Mali and Ethiopia have been net exporters of sheep and goat meat. Over the period considered, exports more than doubled in Mali and rose appreciably in Sudan, while Côte d'Ivoire and Nigeria were again net importers. Trade in goat meat, lamb and mutton was insignificant in Zimbabwe.

Trade in milk consists mostly of dried, condensed and evaporated milk imports. As suggested earlier, milk production in the study countries has been growing more slowly than demand. The result has been a substantial increase in imports (Table 10). In liquid milk equivalent (LME) terms, milk imports to the study countries increased by 10% a year between 1971–73 and 1983–85. The rapid growth in imports has been stimulated by the availability of subsidized skimmed milk powder from developed countries which has been increasingly used as food aid. Côte d'Ivoire and Nigeria import more than 50% of the milk products they consume, Mali imports about 15% while the remaining three countries import between 5 and 10%.

Table 8. *Average annual trade in beef by country, selected periods[1] ('000 tons).*

Country	Exports			Imports			Net exports or imports (–)		
	1971–3	1977–9	1983–5	1971–3	1977–9	1983–5	1971–3	1977–9	1983–5
Côte d'Ivoire	0.0	0.1	0.1	36.5	41.8	37.9	–36.5	–41.7	–37.8
Ethiopia	17.3	2.4	3.7	0.1	0.0	0.2	17.2	2.4	3.5
Mali	21.9	15.7	45.5	1.1	0.3	0.6	20.8	15.4	44.9
Nigeria	0.1	0.3	0.0	34.5	57.9	53.0	–34.4	–57.6	–53.0
Sudan	7.8	2.1	3.4	0.7	0.3	0.4	7.1	1.8	3,0
Zimbabwe	44.6	60.8	21.8	0.0	0.1	0.0	44.6	60.7	21.8
SSA	254.4	212.7	153.0	164.3	196.6	270.4	90.1	16.1	–117.4

1. Trade data for 1971–3 and 1977–9 are from FAO (1985) and include meat and live animals in terms of carcass weight. To obtain figures for 1983–85, trade data on fresh bovine and canned meat (ILCA 1987b; FAO 1989) were added to the meat equivalent of live cattle traded. The latter was calculated using FAO (1986a) carcass weights as conversion factors.

Source: FAO (1985, 1986a and 1989); FAO Trade Yearbook (1985) and ILCA (1987b).

Table 9. *Average annual trade in sheep and goat meat by country, selected periods[1] ('000 tons).*

Country	Exports			Imports			Net exports or imports (–)		
	1971–3	1977–9	1983–5	1971–3	1977–9	1983–5	1971–3	1977–9	1983–5
Côte d'Ivoire	0.0	0.0	0.0	4.5	5.2	3.8	–4.5	–5.2	–3.8
Ethiopia	0.6	0.2	0.4	0.0	0.0	0.0	0.6	0.2	0.4
Mali	2.1	2.8	5.2	0.0	0.0	0.0	2.1	2.8	5.2
Nigeria	0.0	0.0	0.0	3.3	3.5	3.1	–3.3	–3.5	–3.1
Sudan	3.8	5.4	7.1	0.0	0.0	0.1	3.8	5.4	7.0
Zimbabwe	0.0	0.3	0.0	0.0	0.4	0.0	0.0	–0.1	0.0
SSA	43.2	60.2	37.5	16.0	15.6	17.8	27.2	44.6	19.7

1. Trade data for 1971–3 and 1977–9 are from FAO (1985); 1983–5 figures were obtained by adding up trade data for fresh sheep meat (ILCA 1987b) and the meat equivalent of live sheep and goats traded (in terms of carcass weight).

Sources: Same as Table 8.

Table 10. *Average annual trade in milk by country, selected periods[1] ('000 tons of LME).*

Country	Exports			Imports			Net exports or Imports (–)		
	1971–3	1977–9	1983–5	1971–3	1977–9	1983–5	1971–3	1977–9	1983–5
Côte d'Ivoire	2.5	1.2	1.2	55.4	121.7	129.5	–52.9	–120.5	–128.3
Ethiopia	0.1	0.1	0.0	6.4	26.4	114.0	–6.3	–26.3	–114.0
Mali	0.0	0.0	0.0	10.4	22.2	24.4	–10.4	–22.2	–24.4
Nigeria	0.0	0.0	0.0	224.5	588.3	371.8	–224.5	–588.3	–371.8

Sudan	0.0	0.0	0.0	16.8	34.5	93.0	–16.8	–34.5	–93.0
Zimbabwe	0.3	2.3	0.7	9.7	4.5	18.7	–9.4	–2.2	–18.0
SSA	38.5	29.2	3.7	751.2	1580.2	2014.0	– 712.6	– 1551.0	–2010.4

1. Trade data on milk include fresh, dried, condensed and evaporated milk and are expressed in terms of liquid milk equivalent (LME) using FAO (1978) conversion factors i.e. 1 kg fresh milk – 1 kg LME; 1 kg dried milk – 7.6 kg LME and 1 kg condensed/evaporated milk –2 kg LME.

Source: FAO Trade Yearbooks (various issues).

Policy implications

Although the output, consumption and trade trends presented above need to be interpreted with caution, the underlying message is clear. Production of meat and milk in the study countries over the last 15 years has risen only slightly or has declined. The gap between production and consumption, which was very narrow at the beginning of the period, has widened significantly. As a result, there has been a growing tendency to meet demand, particularly for milk, through imports.

Domestic production has been unable to satisfy demand due to a variety of constraints which include environmental and technological problems. However, a fairly wide consensus has now emerged which seems to indicate that the main causes are to be found in the incentive policies pursued by most governments (Schultz, 1978; World Bank, 1981 and 1983). Often these policies have run counter to the producer's interests, though such was not always the intention. For example, policies which place ceilings on meat and milk prices at the producer and retail levels or impose export taxes have been cited as inhibiting growth in production while subsidizing domestic consumption.

The realization of an expanded and sustainable meat and milk production has also not been made easy due to the numerous goals pursued within the livestock sub-sector and lack of agreement on trade-offs between policies. For example, rural dairy production is labour intensive and the employment effects from its expansion can be substantial. For rural producers with relatively modest incomes, it can be reasonably argued on equity grounds that governments should consider protecting the rural dairy producers from concessionary imports. Yet, livestock policy goals, if they are formulated to provide "cheap" milk to urban consumers may lead to a different set of policy recommendations.

Thus, understanding the interrelationships and conflicts between objectives and policies is a critical step towards designing and implementing more effective incentive systems. The multiple objectives of price policies and the trade-offs inherent in the pursuance of such objectives are examined in detail in the next chapter.

3. Objectives and instruments of livestock pricing policies in the study countries

In almost every country, developed and developing alike, governments intervene in agricultural markets.[3] In particular, all African states formulate and implement policies which affect agricultural and food prices. The reasons for government intervention in price determination are diverse and varied. This chapter reviews the multiple objectives of livestock price policies in the selected countries and analyses the main instruments employed to influence both producer and consumer prices. It examines the conflicts that often arise between objectives and assesses the appropriateness of some of the instruments in use. It concludes with a discussion on the variety of arguments that have been advanced to rationalize government intervention in pricing policies.

3. A distinction can be made between interventions due to market failures and interventions arising from other motives. The former set of interventions can be justified on theoretical grounds, but the general body of literature on the price policies of developing countries takes a very negative view of the latter. It is the latter set of interventions that are considered in this chapter.

Objectives of livestock price policies

Although there are several objectives of livestock pricing policies in the study countries, the many different objectives pursued in this field can be summarized under six headings viz: self-sufficiency; export promotion; stabilisation and inflation control; government revenue generation; improved nutrition, and employment creation. The specific objectives pursued in each of the selected countries are marked in Table 11. While the objectives are, to a certain extent, mutually reinforcing, in a number of cases there can be conflict between them.

Table 11. *Major livestock policy goals in the study countries, 1975–85.*

Goal	Country					
	C. I.	Eth.	Mali	Nig.	Sud.	Zim.
Self-sufficiency	X	X	X	X	X	X
Export promotion		X	X		X	X
Stabilisation and inflation control	X		X	X	X	X
Government revenue generation	X	X	X	X	X	X
Improved nutrition				X		X
Employment creation		X		X		X

Note: C.I. = Côte d'Ivoire; Eth. = Ethiopia; Nig. = Nigeria; Sud. = Sudan; Zim. = Zimbabwe

The following notes sketch the main features of the objectives listed summarily above.

The self-sufficiency objective

Of all the stated objectives, the basically consumer-oriented objective of attaining meat and milk self-sufficiency (or improved food security in livestock products) ranked as the most common. As Table 11 indicates, the objective is ubiquitous in the study countries. This is not surprising given the nutritional importance of meat and milk in the diet and, the domestic political risks associated with shortages of these products. Equally important is the desire to reduce dependence on imports in the face of foreign exchange shortages and unpredictable world prices.

Ideally, the self-sufficiency objective could be achieved by following a production-oriented price policy. This was the approach followed by the Republic of Korea in the 1960s and particularly since 1970 with respect to rice. By raising the real producer price of rice and implementing other price-related incentive measures, Korea was able to achieve self-sufficiency in rice in 1977 and in the process the yield of rice per hectare outstripped that of Japan and the United States (Paukert, 1988).

While similar policies could, in principle, be applied to the livestock sub-sector, this has not usually been the practice in SSA. In most cases, priority has been given instead to "cheap food" policies, and this has kept down the prices paid to producers as well as consumer prices. As will be seen later on in chapters 5 and 6, even in those instances where producer prices have risen, restrictive trade and exchange rate policies have been partly responsible for such increases.

More importantly, judging by the production and consumption trends presented in the previous chapter, self-sufficiency in meat and milk has not been achieved for any considerable length of time in most of the study countries. In fact, the self-sufficiency ratio[4] in meat and particularly in milk has tended to decline over the last 10 years, although there are considerable fluctuations in the ratio between countries and between consecutive years.

4. Defined as the ratio of domestic production to total consumption.

Thus, while the Korean example and other similar cases appear to indicate that appropriate price policies can move a country toward the goal of self-sufficiency, inappropriate policies, on the other hand, can lead to outcomes precisely opposite to those intended or at least stated. At this point, it is important to note that most of the study countries, undoubtedly, possess considerable animal resources. However, there hardly exist any detailed analysis of the comparative advantage that each country has in the production of particular livestock products. Such studies, by providing a framework for assessing the advantages that a given country has in the production of a particular product, can give policy-makers an idea of the feasibility of achieving self-sufficiency in meat and milk products.

The export promotion objective

This objective, which is associated with the desire of most governments to improve the contribution of the livestock sub-sector to net foreign exchange earnings, is another frequently

expressed production objective of price policy. As Table 11 indicates, it constitutes an important aspect of the export diversification programme in four of the selected countries.

Generally, the rate of growth of exports will depend significantly on the stimulus from export markets and on the incentives provided by domestic price and trade policies. However, even with a strong external stimulus, domestic price policies may still impede the growth of exports in several ways. First, it is fairly obvious that exports of livestock and their products will increase only if growth of production exceeds growth of consumption. This might require producer prices to rise to spur production and restrict consumption. But if prices are controlled at the producer and consumer levels this may discourage production and encourage consumption — the opposite of the desired effect.

Secondly, the manner in which the state intervenes in export marketing can have a profound impact on the level of exports. In most SSA countries, export marketing is under tight government control, when not a state monopoly.[5] These intervention agencies have been used in the past as instruments of taxation with often negative consequences for exports.

5. Among the livestock exporting countries considered in this study, government parastatals intervene directly in export marketing by purchasing and exporting livestock and animal products in Ethiopia and Zimbabwe, while the parastatals provide only regulatory and service functions in Mali and Sudan.

In addition, inappropriate exchange rate policies can have deleterious effects on the development of the livestock export sector. Indeed, it has been argued that part of SSA's decline in agricultural exports stems from lack of international competitiveness due to overvalued exchange rates, export taxation etc. (FAO, 1986b; Oyejide, 1986). The relative importance of these direct and indirect price policies in promoting or inhibiting the growth of livestock output, including exports, in the study countries will be empirically examined later.

The stabilisation and inflation control objectives

The stabilisation objective can take two forms viz: price – and income – stabilisation. With respect to the former, the aim is to stabilise or minimise seasonal or year-to-year price fluctuations with a view to achieving both consumer and producer price stability. The income stabilisation objective, on the other hand, is basically producer-oriented. For instance, Nigeria's agricultural policy document states that one of the policy objective of the livestock sub-sector is "to improve and stabilise rural income emanating from livestock production and processing" (Nigeria, Federal Ministry of Agriculture, 1988). Virtually all the countries studied included price stabilisation objectives in their policies.

A common mechanism for reducing seasonal fluctuations in agricultural prices takes the form of government purchases when seasonal prices are very low and sales later in the year when diminishing supplies drive up prices. However, mainly due to the perishability of livestock products, this kind of measure has not been applied in the study countries. Instead, reliance has been placed in countries pursuing this objective (e.g. Côte d'Ivoire, Mali, Sudan and Zimbabwe) on consumer price controls. At the same time, pricing policies aimed at reducing year-to-year fluctuations have been pursued, particularly in Zimbabwe, to protect producers against losses caused by vagaries of the weather and price fluctuations in the world market.

At this point it is pertinent to note that some economists have argued that what is of crucial importance to producers is stabilising their income, not stabilising the prices of their produce (Stiglitz, 1987). Their argument is that if price and quantity are negatively correlated, stabilising prices may actually exacerbate the fluctuations in income. There is some validity in this argument, particularly with respect to beef production, since other studies have established that the short-run slaughter response is almost always in a direction opposite to the current change in domestic producer price (Rodriguez, 1985; Jarvis, 1986).

Turning to the inflation control objective, the underlying motive is that it is necessary to keep down producer prices in order to make exports competitive and to constrain consumer price increases which could put upward pressure on wage levels and the prices of manufactured goods. While this argument has some merit, the fact that is often ignored is that price policy alone cannot be used to keep inflation in check. The experiences of some of the countries studied indicate that price controls will fail to curb and may even exacerbate inflation. This happens when the prices fixed for meat and milk and other consumer goods are too low in relation to existing supply and demand. Scarcity of goods sold at controlled prices rapidly develops, and a parallel market is created with prices higher than would exist in the absence of price controls. Producers faced with unattractive prices shun or reduce their supplies to the official agencies and sell instead on the parallel market. As a result, the proportion of goods sold at controlled prices falls, while the proportion of parallel market sales grows, with an inflationary effect. Sudan and Zimbabwe have lately experienced this problem with regard to milk and meat respectively.

The government revenue objective

Another objective of price policy is to raise revenue for government development tasks. The principal source of government revenue is, of course, taxation. Trade taxes (e.g. import tariffs and export taxes) are commonly used in all the study countries. In Mali, for example, the World Bank (1975) estimated that export taxes together with other levies and fees (e.g. butchers' and cattle dealers' licences, slaughtering fees etc.) contributed about 6% of total public revenues (amounting to F CFA 11,612 million) in 1970-72. Apart from generating revenue, trade taxes also have an important influence on the prices received and paid by producers and consumers respectively. Export taxes on livestock products tend to lower domestic prices, while import tariffs tend to raise domestic prices. In addition, price policy has often been pressed into service to raise government revenue chiefly because most developing countries lack an adequate administrative base for imposing direct taxes. The main instrument in this respect is the marketing board, which purchases livestock products at low prices, and either resells them domestically or exports them, at higher prices. The difference, which constitutes the government's profit from livestock price policy, can form a significant addition to government revenue. The Livestock and Meat Corporation (LMC) of Ethiopia and the Cold Storage Commission (CSC) in Zimbabwe, were partly set up for this purpose. Unfortunately, over the last few years, the governments of Ethiopia and Zimbabwe have had to subsidies these agencies instead of deriving revenue from them. In the case of the CSC the problem arises partly because, apart from export marketing, the body is also charged with the responsibility of purchasing beef for domestic marketing. Up till 1983, Zimbabwe pursued a "cheap beef for consumers" policy. The beef purchase price policy of the CSC was directly linked with beef consumer subsidies. By using CSC's export earnings to lower the price of beef to consumers, the government was

indirectly taxing producers while subsidizing consumers. Even here the export earnings of the CSC could have added to government revenue, but the government chose instead to use the funds to reduce the cost of keeping consumer prices low.

The improved nutrition objective

This objective plays a prominent part in the justification of pricing policies in two of the study countries (Table 11). Its aim is to increase the level of household consumption of animal proteins -on the face of it- a highly praiseworthy objective. Its implementation is, however, more problematic.

Ideally, for this objective to be achieved, producer prices need to be high enough to provide adequate incentives to producers to expand output, and consumer prices low enough, or at least designed in such a way as to enable the poorer classes to benefit more than the wealthier ones. But a marked increase in the prices of meat and milk to encourage production can have a significant impact on the standard of living of urban workers, leading to demands for higher wages and creating inflationary pressures in the economy. Moreover, attempts to increase food prices suddenly, as in Sudan in early 1985, have frequently been the overt reason for strikes and riots. However, attempts to suppress consumer price increases through subsidies can put an enormous strain on government budgets, leading to increased government borrowing and a possible expansion in the money supply that in itself can be inflationary. Zimbabwe, for example, experienced problems emanating from escalating consumer subsidies in the 1970s and early 1980s.

More importantly, the use of consumer subsidies means favouring the urban sector (rich and poor) at the expense of the rural population since such schemes are easier to administer in cities than in inaccessible rural areas. Also, if consumer prices are reduced by paying producers low prices, urbanites (rich and poor) again benefit at the expense of rural dwellers and this may discourage expansion of output. Thus this objective, meritorious at first sight, can be very negative from the efficiency and distributional points of view if adequate care is not taken in its implementation. In terms of concrete achievement, available evidence presented elsewhere (Williams, 1989) indicates that not much progress has been made toward the attainment of this objective in Nigeria. The situation is not largely different in Zimbabwe, the other country pursuing this objective.

The employment creation objective

The idea underlying this objective is to use price policy to provide rural employment through expanded livestock production, processing and marketing. The labour intensive nature of some aspects of livestock production (e.g. dairy production) suggests that the direct and indirect employment effects of output expansion can be substantial. Such rural employment opportunities can help to stem the tide of rural - urban migration and ease the pressure on social amenities in the cities. Further since average rural incomes are lower, and often several times lower, than average urban incomes, it is not surprising that governments concerned with long-run agricultural development are willing to consider using price policy to encourage more intensive livestock production systems.

High producer prices that will provide an incentive for expanded production and innovation constitute a necessary condition for the attainment of this objective. As will be seen in the next chapter, real livestock producer prices increased slightly over the past decade in two of the countries pursuing this objective. Nevertheless, the evidence of an upward trend in real producer prices does not resolve the question as to whether these prices rose enough to encourage the kind of investment needed to create additional employment opportunities. Besides, other technical and economic policies pursued in some of these countries have tended to offset whatever incentive was forthcoming from rising producer prices. For example, in Nigeria beginning in the 1970s the government established a number of dairy processing plants near the major urban centres. The milk for processing was to come from associated government dairy farms and from local collection. However, inadequate purchase prices offered by the plants made local milk collection difficult and the plants started basing their production activities on reconstituting imported powdered milk which was cheaper than locally produced milk because of depressed international prices and the appreciation of the real exchange rate of the naira during this period. Thus, both internal and external factors have militated against the attainment of this objective. The picture just painted for Nigeria is not altogether atypical of the situation in the other countries attempting to implement this objective.

Instruments of livestock price policies

Before examining the conflict inherent in attempting to implement some of the aforementioned objectives, it will be useful to review briefly the instruments through which livestock price policies are applied.

Although there is a variety of intervention tools for influencing livestock product prices, the main instruments in use in the study countries are summarised in Table 12.

Table 12. *Major instruments of livestock price policies in the study countries, 1975–85.*

Instrument	Country					
	C.I.	Eth.	Mali	Nig.	Sud.	Zim.
Controlled producer prices		X				X
Controlled consumer prices	X		X		X	X
Input subsidies	X			X		
Consumer price subsidies						X
Import tariffs	X		X	X	X	X
Import licences	X		X	X	X	X
Foreign exchange allocations			X	X	X	X

Export taxes		X	X		X	
Export licences		X			X	

Note: C.I. = Côte d'Ivoire; Eth. - Ethiopia; Nig. = Nigeria; Sud. = Sudan and Zim. = Zimbabwe

As the table clearly indicates no single instrument is ever used alone in a country. Frequently, a number of instruments are used concurrently. Understanding the inter-relationships between instruments is of crucial importance in designing effective price policies. In what follows, the pricing instruments listed summarily in Table 12 are discussed under four major headings: price controls; price subsidies; import- and export-measures.

Price controls

Controlled or administered producer prices are used by governments in some of the countries studied to implement purchase price policies for basic food and exportable commodities. A complementary instrument, in the form of a marketing board, is usually employed in conjunction with price controls. Despite the great diversity of country situations, the basic approach is to establish fixed or minimum producer prices for the commodities under consideration, with a parastatal purchasing part of the total output. In determining the level at which to fix the producer prices, various considerations including technical, economic and political factors are often taken into account. An example of this basic model is provided by the producer price policy of Zimbabwe with regard to beef and milk.

The parastatals responsible for the purchase and marketing of these two commodities are the Cold Storage Commission (CSC) and the Dairy Marketing Board (DMB) respectively. Both are placed under the control of the Agricultural Marketing Authority (AMA). The producer price fixing process begins when the AMA conducts initial hearings with farmers' associations on the cost of production incurred within alternative commercial farming systems. Based on the submissions of the farmers' associations and on the trading accounts received from the CSC and DMB, the AMA makes recommendations on producer prices to the Ministry of Agriculture. The latter also holds meetings with farmers' associations to get their views on pricing issues. On the basis of these meetings; the ministry's own cost estimate of production; and on the AMA's recommendations, the Minister of Agriculture in consultation with senior officials then decide on the "appropriate" producer prices to recommend to the Ministerial Economic Coordinating Committee (MECC), which is composed of ministers from other related ministries. After considering the proposals, the MECC makes recommendations to the Cabinet. The final decision on producer prices is ultimately taken at the Cabinet level. The producer prices arrived at in this fashion are then implemented by the CSC and DMB through their purchases of beef and milk from livestock producers. In spite of the relative sophistication of the method by which producer prices are determined, the producer price policy of Zimbabwe with respect to beef and milk have been criticised on grounds of providing insufficient incentives to producers.

There are variations to this basic producer price fixing process in terms of the relative weight given to economic and political considerations. However, some aspects of the same approach can

be found in Ethiopia and to a limited extent in Sudan with regard to milk produced by the government sponsored Kuku Cooperative Dairy Production Scheme and in the cattle ranching and fattening operations of Société pour le Développement des Productions Animales (SODEPRA) in northern Côte d'Ivoire.

At the other end of the spectrum, consumer prices set by official decree are also prevalent in most of the study countries (Table 12). This instrument is normally intended to check price rises in order to curtail increases in the cost of living and to make livestock products available to low-income consumers at affordable prices. The consumer prices set in this manner are, therefore, ceiling prices. Frequently, a subsidy is involved as indicated, for example, by a Zimbabwean government policy document which noted that "for a number of decades past governments pursued a policy aimed at keeping the prices of basic foodstuffs, i.e. maize meal, meat ... as low as possible, whilst at the same time set producer prices at a level high enough to guarantee that consumer demand was met. Such a policy involved direct government intervention through the payment of subsidies to bridge the difference between official procurement prices and official selling prices since any increase in producer prices if allowed to be passed on to the final consumer would place an unacceptable burden on the majority of the population at the lower income level" [Zimbabwe, Ministry of Lands, Agriculture and Rural Resettlement, 1988].

While rationing appears to be an important complement to consumer price controls as it limits demand to the amount of goods available at the fixed price, it is not commonly used in the study countries. Thus, in the absence of rationing, consumer price control tends to be either ignored or, when enforced (at considerable financial cost to the government), tends to give rise to a parallel market with much higher prices.

Furthermore, past experience in some of the study countries has emphasized the frequent tendency for controlled prices to be unduly rigid, raising difficulties when changes are required as it happened, for example, in Sudan in 1985. Also, consumer price controls can hinder the flow of good quality animals to domestic markets, especially during periods of limited supply, because butchers may hold back on purchases due to doubts about their ability to operate at reasonable profit margins. The net effect is to reduce beef supply in those areas where price control are enforced. However, price controls are increasingly recognised as the wrong instrument for providing cheap food to urban consumers and for carrying the main burden of anti-inflationary policies. For these reasons, as well as prodding by the World Bank and the International Monetary Fund, large-scale decontrolling is now taking place in virtually all of the study countries applying this instrument.

Input and consumer price subsidies

Input subsidies are an integral part of livestock price policy in two of the study countries (Table 12). The motive behind input subsidisation is to provide incentives to producers, not by raising the price of their products, but, rather, by lowering their costs of production. Measures, which may include a full range of subsidies for credit, concentrate feeding, veterinary services, transportation and reduced import duties, are frequently designed to secure increased livestock production by encouraging the adoption and use of modern technical packages by livestock

producers. In Côte d'Ivoire, for example, SODEPRA provides subsidised feeds, drugs and veterinary services to livestock producers in the northern part of the country.

In Nigeria, immediately after independence, regional governments helped to finance the introduction and distribution of concentrate feeds to pastoralists. Also during the oil boom, i.e. 1975–83, the federal government made credit available to livestock producers at concessionary rates to promote the purchase of new inputs. In addition, the government has encouraged commercial banks to lend to livestock producers by absorbing some of the risks involved in these investments through the Agricultural Credit Guarantee Scheme. This scheme, which was established in 1978, guarantees the loans made by commercial banks to the agricultural sector and thus serves to lower the price of credit for those seeking to borrow to invest in food and livestock production.

Moreover, the Nigerian government has sought, albeit unsuccessfully, to cheapen the price of land for livestock and agricultural production projects. The government's land decree of March 1978 reserves for the state governments rural land not under active exploitation. A prime purpose of the decree is to make it easier for the state governments to acquire land for public purpose, including the implementation of large-scale grazing reserve and ranching schemes. Unfortunately, as argued elsewhere, these input price measures have not been totally effective in raising the level of livestock production in Nigeria (Williams, 1989). For the most part, these instruments have been manipulated to benefit the large-scale commercially oriented livestock producers at the expense of the small-scale pastoralists who account for the bulk of livestock production in the country.

In contrast to input subsidies intended primarily for producers, consumer price subsidies represent a real effort to keep down the prices of food, including livestock products, consumed by the populace. The cost of this policy is borne either by agricultural producers, in the form of low purchase prices, or more often, particularly when purchase price policy and subsidy policy are separated, by the government. Once implemented, consumer subsidies are difficult to withdraw or to reduce substantially. However, because governments naturally attempt to limit this cost in one way or another, there are a number of differing subsidy instruments.

The most general, i.e. untargeted subsidy, consists of subsidising the consumer prices of a few selected items, usually beef and milk, with no restriction on the quantity bought and open to everyone. All income classes benefit to the extent of their purchases of the subsidised commodities. More often than not, the urban population benefits most on account of their higher incomes and political clout. Such an untargeted subsidy frequently runs counter to the goal of equity, and may actually increase inequality. At the same time due to the extent of consumer coverage, it is an extremely costly policy which places a huge burden on the government budget. This policy instrument is used in Zimbabwe, particularly with respect to beef, and less explicitly in those countries (e.g. Sudan and Mali) where governments attempt to enforce consumer price controls.

Another instrument that is also implicitly used in Zimbabwe is targeted subsidies which attempt to direct consumer subsidies to certain designated groups for whom low-priced food is essential, while containing budgetary costs. The containment of costs is being pursued indirectly through

"geographical targeting" and "self-targeting". By geographical targeting is meant the location of retail shops in areas inhabited mainly by low-income groups. For example, the CSC in Zimbabwe has established a number of "tru-stores" (i.e. retail outlets) in high population density areas to provide consumers with low quality beef at affordable (i.e. effectively subsidised) prices.[6]

6. By 1988, 5 tru-stores had been opened in Harare and 7 in Bulawayo. The CSC is considering opening up more of such stores in the future (Ministry of Lands, Agriculture and Rural Resettlement, 1988).

The self-targeting approach, which relies mainly on the fact that different income groups have different food consumption habits, has also been advocated in Zimbabwe as a way of reducing the budgetary costs of beef and milk subsidies borne by the government. The justification for this lies in the fact that low-grade beef and milk consumers dominate the domestic demand in Zimbabwe. For example, a government policy document estimates that demand for low and high quality beef stands at 92 and 8% of total domestic demand respectively. The same document goes on to state that "our domestic market is dominated by low income consumers and is extremely sensitive to price changes". (Ministry of Lands, Agriculture and Rural Resettlement, 1988 p. 3). Similarly, sterilised milk, with a longer shelf life is more popular in the rural areas than fresh milk. Thus, subsidies can be concentrated on the dominant low-quality beef and sterilised milk consumed by the poor, rather than on high-grade beef and fresh milk consumed relatively more by the middle and upper income classes.

Import duties and quantitative import restrictions

Import tariffs are one of the traditional and most widely used instruments for raising the domestic prices of imports. They are used in virtually all the countries studied. They can be manipulated to give producers whatever degree of protection is desired by insulating domestic prices from international price fluctuations and from the effects of imports subsidised at their source. This is precisely what the government of Côte d'Ivoire has done to stem the downward pressure on domestic cattle and beef prices arising from imports of highly subsidised beef from the European Community (EC). Since 1983, the Ivorian government has imposed import duties of approximately 25% on beef imports from the EC in order to lessen the negative impact of such imports on domestic beef prices.

These instruments are also frequently used for revenue generation and for discouraging the consumption of particular products. In Nigeria, for example, the 1961 federal government budget speech provided a justification for what was to become the future use of this instrument by claiming that tariff "increases were imposed upon goods consumed by the better-off classes of the community". The statement added that "no one could reasonably maintain that imported meat, butter, ..., constitute indispensable or significant items in the family budget of the low income groups which form the bulk of our population" (Federal Ministry of Agriculture, 1987, Annex A p.2). Thus, tariff increases were imposed to serve as an indirect consumption tax and to raise revenue for the government.

Moreover, quantitative import restrictions, effected through import licenses, foreign exchange allocations, physical quota limits on imports and outright bans constitute another quick-acting and powerful instrument that is widely used in some of the study countries to protect domestic

producers against competition from cheaper import supplies. These measures are also used to serve other ends. For instance, a 1988 Nigerian government policy document maintained that "to serve as an incentive for increased production, government's ban on the importation of beef and other meats will remain in force" (Federal Ministry of Agriculture, 1988 p. 26). However, a more powerful reason for the imposition of these measures which is rarely made explicit is the windfall gains that often accrue to those with rights to import licenses and quotas. In the case of Nigeria, it is now well understood that prior to the introduction of the foreign exchange market in 1986, those responsible for trade restrictions together with those who had access to import licenses and foreign exchange allocations were able to gain from the rents implied by the price differential between domestic and world prices. Thus, a reasonable inference is that rent-seeking is at least partly responsible for the implementation of these import restrictive measures in some of the study countries.

Export taxes, licenses, quotas and bans

These instruments are widely used in the livestock exporting countries included in this study. They lower domestic prices and are frequently used to prevent local prices from rising to the international price level when the latter lies above the former. They are also used to ensure that domestic consumption targets are met before any surplus is exported. Thus in July 1986, the government of Sudan imposed a ban on livestock exports in order to satisfy domestic consumption. Prior to that time and beginning in the late 1970s, there was a 5% export tax on small ruminants and their meat products, while export duties of 20 and 15% were imposed on cattle and beef respectively.[7] In addition to these taxes, a would-be exporter, amongst other things must obtain an export license, pay an initial export registration fee and subsequently an annual export registration renewal fee, and must also reserve 30% of the quantity intended for export for the domestic market. The official taxes and fees paid for exporting cattle originating from Nyala in western Sudan in 1983/84 are itemized in Table 13.

7. The export duties on cattle and beef consist, respectively, of a 15 and 10% export tax based on the free-on-board (f.o.b) value of export and a 5% development tax on each product based on the free alongside ship (f.a.s) value of export.]

The specific nature of the taxes and levies imposed on the export of livestock and meat products in Sudan is not unique to this country. They are common in some of the other exporting countries studied, including Ethiopia and Mali[8] While variable taxes and levies, as temporary measures, can improve domestic price stability, a long-term sustained use of these instruments inevitably reduces the incentives to producers and carries the danger of introducing significant price distortions which may be to the disadvantage of the livestock sub-sector in the long-run.

8. For a detailed account of the official levies on the export of livestock in Mali see Delgado (1980), p. 378).

Having briefly discussed the objectives and instruments of livestock price policies in the study countries, the issue of economic and political trade-offs between objectives and the difficulties often encountered in achieving desired objectives through the chosen policy instruments are examined in the next section.

Table 13. *Official taxes and fees required for exporting cattle in Sudan, 1983/84.*[a]

Item	(Sudanese pound/head)
Export registration fee[b]	11.70
Export tax	81.92
Development tax	27.31
Clearance and seaport charges	8.00
Health fees at the port	4.00
Export service fees paid to LMMC	6.00
Bank fees for foreign exchange transactions	4.20
Omdurman market fees (including vaccination and quarantine fees)	6.68
Nyala market fees (including health and local taxes)	6.08
Total[c]	155.89

In 1983/84 1 Sudanese pound = US $0.769

a. Cattle originating from Nyala in western Sudan.
b. Actual registration fee amortized and pro-rated over the number of animals exported.
c. Total levies may vary slightly between different producing areas due to differences in local market charges.

Sources: Sudan. Ministry of Finance and Economic Planning (1986) and Livestock and Meat Marketing Corporation Information Sheet No. 8 (1984).

Trade-offs between objectives and pricing instruments effectiveness in achieving desired goals

The review of livestock price policy objectives in the previous section has emphasized one central point – the multiplicity of objectives, both in the context of individual countries as well as for all the study countries as a group, with consequent scope for conflict and contradiction.

In the first instance, the tendency for conflict between price policy objectives is indicated by the fact that, in at least 5 out of the 6 countries studied, the national policy included as objectives both the provision of producer price incentives and the stabilisation or lowering of consumer

prices. The dilemma here is how to ensure cheap food, including meat and milk, for consumers without depressing producer prices to the extent that incentives for production and marketable surplus are jeopardized. Moreover, most governments want to safeguard the nutritional welfare of urban dwellers and poorer income groups, while at the same time trying to avoid the disruptive effects that rising and unstable livestock product prices can have on the cost of living and consequently on wage levels. In principle, with an appropriate set of pricing instruments, it should be possible to reconcile these conflicting objectives, but this is rarely done.

This brings us to the second point which is that even when an apparently non-conflicting set of objectives (e.g. export promotion and employment creation) is chosen, attempting to implement them all through a single pricing instrument may create conflicts and inconsistencies. For example, if higher producer prices are used in the pursuance of the aforementioned objectives, this may encourage increased production with beneficial effects on employment and may even result in an exportable surplus. However, if producer prices are too high, domestic demand may drop and exports may become uncompetitive thus dampening the growth of output with a possible reduction in employment.

A somewhat different issue is the extent to which the choice of a pricing instrument is dictated by primary concern for objectives of livestock policy, rather than for macroeconomic objectives largely external to the livestock sub-sector. For instance, a key macroeconomic variable for the livestock sub-sector is the exchange rate. As will be seen in the next chapter, until recently virtually all the study countries maintained an overvalued exchange rate which adversely affected the livestock sub-sector by shifting the terms of trade against exports and in favour of imports and non-tradeables. Governments often responded to the resulting trade imbalances by placing stiff tariffs or quotas on imports. However, the imposition of these same measures has been frequently justified on the grounds that it will bring about the realisation of self-sufficiency. But as explained above, the measures would have been implemented anyway to reduce the problems created by an overvalued exchange rate.

Similarly, there is a potential conflict between achieving domestic livestock objectives through the price mechanism and maintaining an external balance. The traceable nature of livestock products and inputs implies that the choice of a particular set of pricing instruments (e.g. import tariffs/quotas, export taxes/subsidies and exchange rates) can have a considerable impact on both the performance and fortunes of the livestock sub-sector, the overall balance of payments and the growth of the economy. The point is simply that when pricing instruments are used to achieve, say, macroeconomic objectives, they may have an indirect effect on livestock policy objectives, but because they were not implemented with the latter in mind, inconsistencies may result.

These problems are further compounded when pricing decisions affecting the same commodities or inputs are made in a variety of government departments. For example, as indicated in the previous section, it is not uncommon to find the producer prices of meat and milk being determined by the Ministry of Agriculture, while the Ministry of Trade and Commerce is responsible for fixing consumer prices. At the same time, interest rates for credit schemes and the foreign exchange rate that affects the domestic price of exports and imported livestock products, may be set by the Ministry of Finance or the Central Bank. Frequently, definite positions based on different criteria are assumed before the co-ordination of these pricing

decisions are taken. In other cases, co-ordination is inadequate or non-existent. As a result, there can be confusion of objectives and the pricing instruments may be used in ways different from those originally intended.

Altogether these problems raise doubts as to the degree of effective control that governments have in using the price mechanism to achieve some of their declared objectives. It is fairly obvious that several of the goals discussed in the previous section are conflicting, yet governments in most cases still pursue them. A question might be posed: why do governments persist in pursuing these goals through price intervention policies? This is the question that is examined in the next section.

Reasons for government intervention in pricing policies

Although there now exists a wide variety of arguments on why governments intervene in agricultural pricing policies, two strands of the debate are of relevance to this study. On the one hand, some economists like Stiglitz (1987) have argued that "to understand the nature of government interventions in agricultural markets, one must approach the problem from the perspective of the second best". The main problem is that most developing countries do not have the administrative capacity to implement an effective and equitable income tax system. As a result, the marginal social cost for implementing an income tax system may be unduly high. According to Stiglitz, failure to recognise this fact, i.e. lack of a first-best solution to revenue generation, has given rise to much of the controversy over state intervention. Thus, naive views advocating noninterference in free markets or even the more sophisticated view based on optimal tax theory that "government should not impose trade taxes" become untenable once it is recognized that the government has limited instruments for collecting revenue (implying that some distortionary taxation is necessary) and redistributing income (so that perhaps a way of improving the welfare of the poor may be through taxes on commodities consumed by the rich, with revenue so generated used to subsidize the poor).

On the other hand, those in the public choice tradition like Robert Bates (1981) argue that misguided price intervention policies pursued by governments in Africa are the result of short term decisions made by rulers on the basis of political self-interest. For Bates, the impartiality of the state cannot be taken for granted. Rather, the elite controlling state power often pursues policies designed to maintain itself in power. He argues that policies which appear incomprehensible and irrational make perfect sense when viewed from this angle. Thus, price policies which exploited the rural sector in many African countries can be understood once it is recognized that farmers and pastoralists make poor coalition partners because of their limited political power, and resources extracted from them can be used to benefit the elite directly or strengthen its power by appeasing the better organized and more powerful urban population. Similarly, Ghai and Smith (1987) argue that government control over the agricultural marketing system (through marketing boards, import licenses and foreign exchange allocations) brings with it control over substantial resource flows, which governments may use for their own purposes or allow different groups or individuals to enjoy as a way of dispensing political patronage.

Undoubtedly, the various perspectives in this debate on government intervention are valuable and need to be carefully scrutinized. Nonetheless, the wide variety of policies pursued by

governments in the study countries and their different outcomes suggests that the relative importance of these explanations will differ from country to country. The evidence presented in this chapter on the objectives and instruments of livestock price policies provides an indication of the relevance of these different perspectives in explaining the behaviour of governments in the study countries.

4. The effect of price intervention policies on livestock producers and consumers in the study countries

Having examined the goals of livestock pricing policies and the main mechanisms through which prices are influenced in the study countries, attention is turned in this chapter to an analysis of the official price data on livestock products. The price data are analysed with a view to determine how successful governments have been in meeting some of their stated objectives, and to measure the impact of price intervention policies on production incentives and consumer prices. The methodology used for the analysis is set out in Appendix 1. The sources and limitations of the data used and the constraints which they impose on the interpretation of the results are also discussed in Appendix 1. In what follows, we first examine empirical evidence on the real producer price of livestock products and the real border equivalent producer prices. Next, variations in the-two prices over time are analysed and nominal protection coefficients (NPCs) are estimated to establish the relative degree of implicit taxation or subsidisation of producers. The trend in real consumer prices is then examined and NPCs are also estimated for consumers. The chapter concludes by drawing out the implications of the results for livestock production incentives and for the effectiveness of governments in influencing prices to achieve their objectives.

The real producer price of livestock products

Real producer prices, obtained by deflating farm-gate prices by the consumer price index (CPI), provide a direct, albeit incomplete, measure of incentives provided to livestock producers when technology and prices for inputs are held constant.[1] The incentives are transmitted through the cost of consumer goods as measured by the CPI and will generate income and work/leisure substitution effects as a result of changes in the real returns to labour.[2] Viewed in this light, the incentive (disincentive) effect arises when the prices received by the producer exhibit a significant upward (downward) trend relative to the cost-of-living index as measured by the CPI. This means that producers receive an incentive when nominal producer prices rise faster than inflation and a disincentive when domestic inflation exceeds the rise in nominal producer prices and thus erodes the purchasing power of producers' income. In countries where producer prices are fixed, rising real producer prices will occur when official prices are raised much faster than inflation, possibly through liberalization of marketing and pricing policies. Conversely, infrequent or insufficient adjustments to officially fixed nominal prices coupled with high domestic inflation will bring about declining real producer prices.

1. For a discussion of the rationale and limitations of using the CPI as a deflator of producer prices, see Appendix 1.

2. In principle, it is possible to distinguish between three related kinds of price incentives to producers viz: incentives to encourage the substitution of work for leisure with the ultimate aim of increasing the output of a commodity; incentives to promote the production of a domestic commodity over other competing domestic products; and incentives to stimulate the domestic production of a commodity in order to reduce the volume of competing imports. The discussion in this section is limited only to the first kind of incentives since competing domestic products and imports are not explicitly considered here. However, the incentive system in a country may encompass all three kinds of incentives.

The estimated rates of growth of real domestic producer prices in the study countries between the early 1970s and mid-1980s are shown in Table 14. Some caution has to be exercised in comparing results across countries and commodities. This is because for one of the study countries, i.e. Mali, a CPI does not exist. Instead, the food price index (FPI) has been used to deflate producer prices. Moreover, while similar time periods were used for beef and mutton, a slightly different time period was used for milk due to non-availability of data for one year in one of the study countries.

Nonetheless, the table indicates that there were four statistically significant cases of increases and two statistically significant cases of decreases in the real domestic producer prices of the commodities surveyed. If the signs of the non-significant coefficients are examined, the table shows that on balance there was a general picture of upward movements in real producer prices. The pattern, however, varies among commodities even within the same country. For example, in Côte d'Ivoire the producer price for beef fell, while it increased for mutton over the same period.

Real border equivalent producer prices (RBEPPs) were also estimated for the study countries in order to assess the opportunities available to producers through international trade and to provide a basis for comparison with real domestic producer prices[3]. For each commodity, the RBEPP was estimated by converting a world representative price into domestic currency using the official exchange rate and then deflating by the domestic rate of inflation. The estimate thus obtained provides an, indication of the real value of the border price in domestic terms and will vary from one country to the other depending on the rates of exchange and domestic inflation.

3. In general, the use of border prices as the point of reference in price policy analysis does not imply that international prices are necessarily "fair" or "equitable", but simply that such prices are measures of the alternatives available to a country under free trade. Thus, they provide a guide for the use of that country's resources (Johnson, 1978). See Appendix 1 for a discussion of the method used to derive BEPPs.

The rates of growth of real border equivalent producer prices are shown in Table 14. In principle, the lower the rate of inflation and/or the higher the rate of devaluation of the exchange rate, the greater will be the tendency for the RBEPP to rise in domestic currency terms. Conversely, countries with a high rate of inflation and a relatively constant exchange rate, i.e. countries allowing their currencies to become overvalued will show a rapidly declining RBEPP. Table 14 underscores this latter point for all the study countries. As the table shows, RBEPPs fell in real domestic terms in all the countries studied. If this result is taken together with the fact that the real domestic producer price rose in some countries and fell less rapidly than the RBEPP in others (see also Figures l and 2), the implication is that the ratio of domestic producer price to BEPP will, at least, show a moderate increase in most of the study countries. This point is largely confirmed as we shall see later on in this chapter.

Table 14. *Annual percentage growth[a] in real domestic and border equivalent producer prices in the study countries, 1970–86[b].*

Product and country	Compound annual percentage rate of growth 1970/72 to 1984/86	
	Real domestic producer price	Border equivalent producer price in real domestic terms
Beef		
Côte d'Ivoire	–1.3	–3.9 ns
Mali	–3.9	–5.3
Nigeria	0.2 ns	–4.6
Sudan	5.8	–6.5
Zimbabwe	–0.2 ns	–0.7 ns
Mutton		
Côte d'Ivoire	3.3	–2.5
Nigeria	–0.7 ns	–6.7
Sudan	6.4	–1.6 ns
Cow's Milk[b]		
Mali	2.4 ns	–2.9
Sudan.	1.3 ns	–7.4
Zimbabwe	4.0	–1.6 ns

ns: not statistically significant at the 0.1 level

a. The annual growth rates have been estimated as log-linear trends by ordinary least squares regression.
b. For milk, growth rates were estimated for the period 1971/73–1984/86.

Source: Estimated from data collected from the study countries by the author.

Price variation

At this juncture, it is useful. to examine a slightly different issue relating to the degree of price variability in the study countries. As discussed in chapter three, one policy objective that is frequently mentioned by most governments is price stabilisation. Table 15 gives an indication of how successful the study countries have been in minimising year-to-year variations in producer prices. Judging by the coefficient of variation, except for mutton in Côte d'Ivoire and milk in Mali, real domestic producer prices have fluctuated less than RBEPPs over the entire period covered. This finding is also partly confirmed by Figures 1 to 3. When the entire period covered is divided into two sub-periods, the above result remains largely unchanged With respect to beef in Côte d'Ivoire, Mali, Sudan and Zimbabwe, in the period 1970–78, the coefficient of variation in RBEPP was at least four times higher than the coefficient of variation in real domestic producer prices (see Appendix 2). Further, if the variation in real domestic producer prices is considered alone, the results indicate that for beef in Côte d'Ivoire, Nigeria and Zimbabwe and for mutton in Côte d'Ivoire and Nigeria, the variation in domestic producer prices was higher in the period 1970–78 than it was in the period 1979-86. However, the opposite seems to be the case for beef and milk in Mali and for beef, mutton and milk in Sudan (see Appendix 2). For Sudan, part of the explanation for the higher coefficient of variation in real domestic producer prices in the period 1979–86 (compared with 1970–78) lies in the successive devaluations of the Sudanese pound which started around 1979 and continued for much of the 1980s. The devaluations which were necessitated by structural imbalances within the economy led to wide fluctuations in food prices, including the prices of livestock products (see also Umbadda and Shaaeldin, 1985).

Table 15. *Variability in real domestic and border equivalent producer prices, 1970–86.*

Product and Country	Real producer price		Border equivalent producer in real domestic price terms	
	S.D.	C.V.	S.D.	C.V.
Beef				
Côte d'Ivoire	55.0	10.7	171.5	42.8
Mali	94.0	19.5	140.2	45.8
Nigeria	0.7	23.4	0.4	25.1
Sudan	0.3	39.3	0.2	67.3
Zimbabwe	9.9	11.9	21.9	48.1
Mutton				
Côte d'Ivoire	140.9	16.2	106.6	15.5

Nigeria	1.2	22.4	0.5	29.8
Sudan	0.4	34.3	0.1	36.0
Cow's Milk[a]				
Mali	31.2	34.7	34.3	23.3
Sudan	0.1	18.5	0.1	33.5
Zimbabwe	2.7	17.3	3.7	18.8

a. For milk, the period considered was 1971–86.

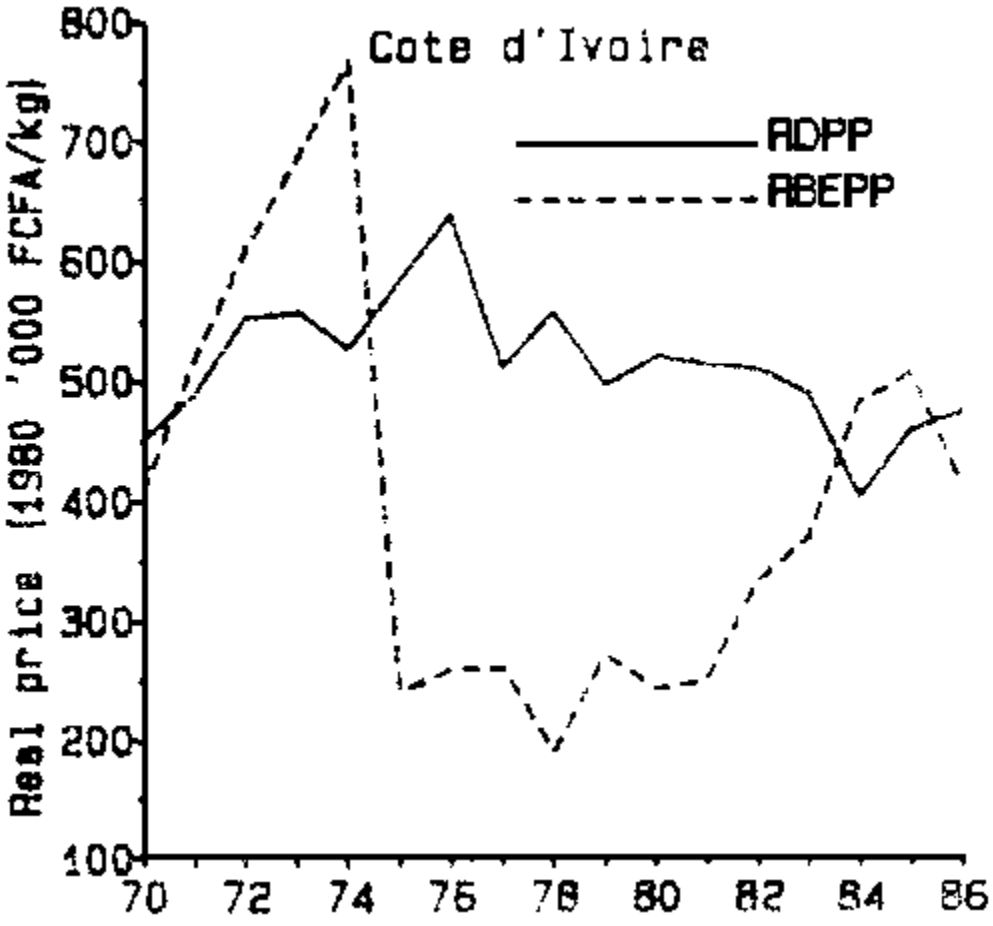
Notes: (1) S.D.=Standard Deviation and C.V.= Coefficient of Variation
(2) Nominal and real producer prices for the products and periods covered in this table are given in Appendix 4 tables 1 to 12.

Source: Estimated from data collected from the study countries by the author.

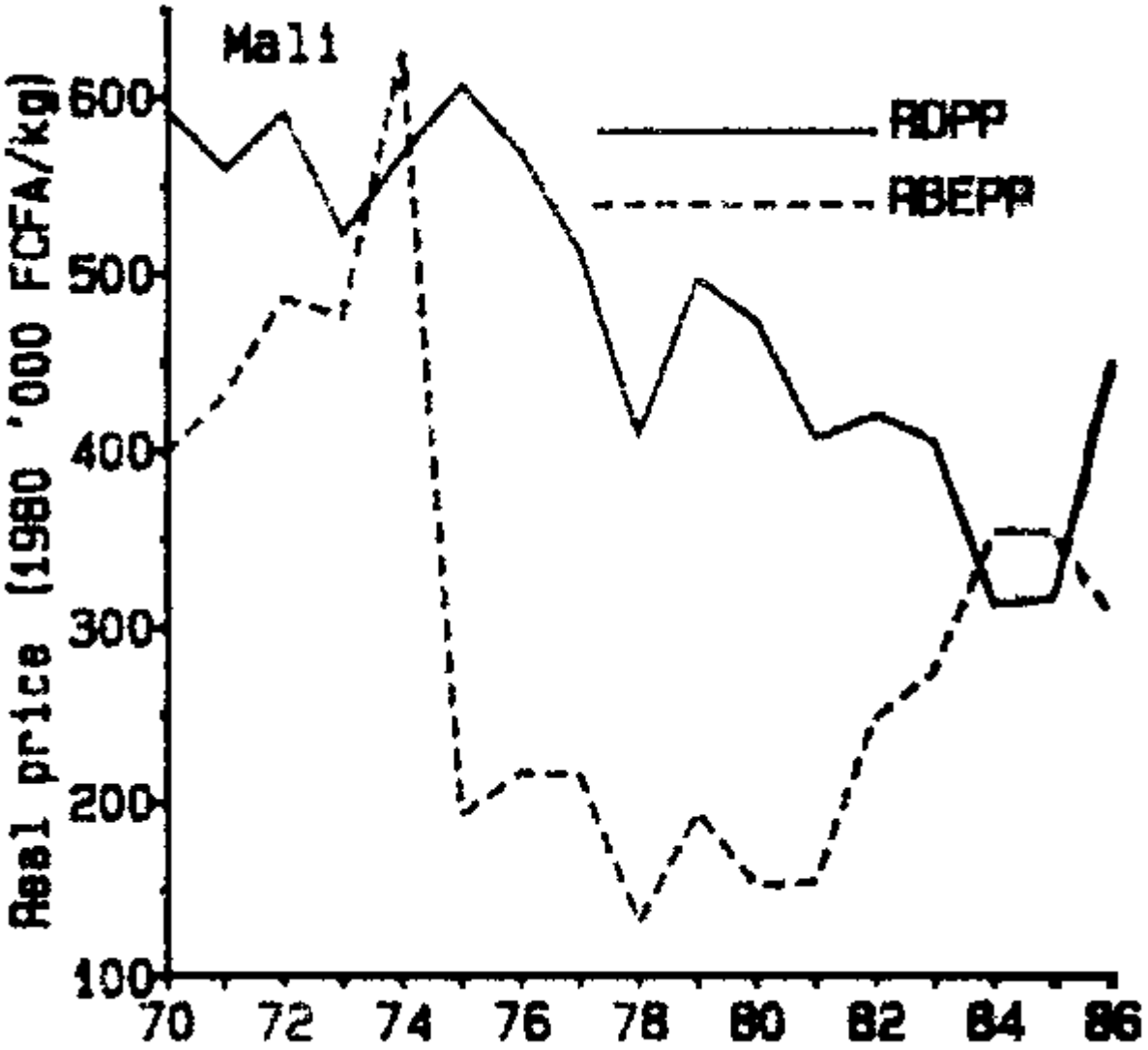
Overall, the results suggest that in comparison with RBEPPs, a certain degree of success was achieved in the study countries in minimising the year-to-year fluctuations in real domestic producer prices over the period considered.

Figure 1. *Comparison of real domestic and border equivalent prices for beef in some of the study countries, 1970–86:*

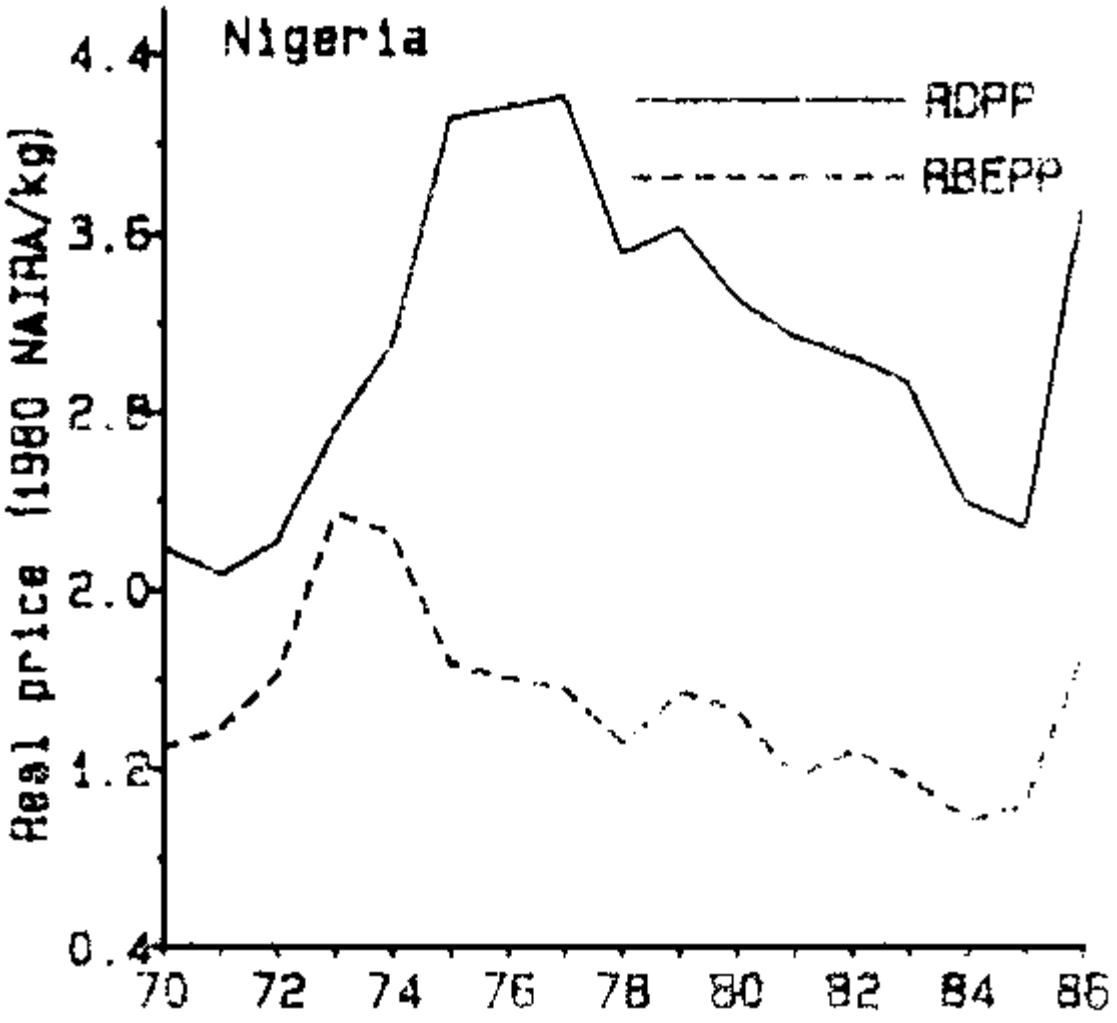
Côte d'Ivoire



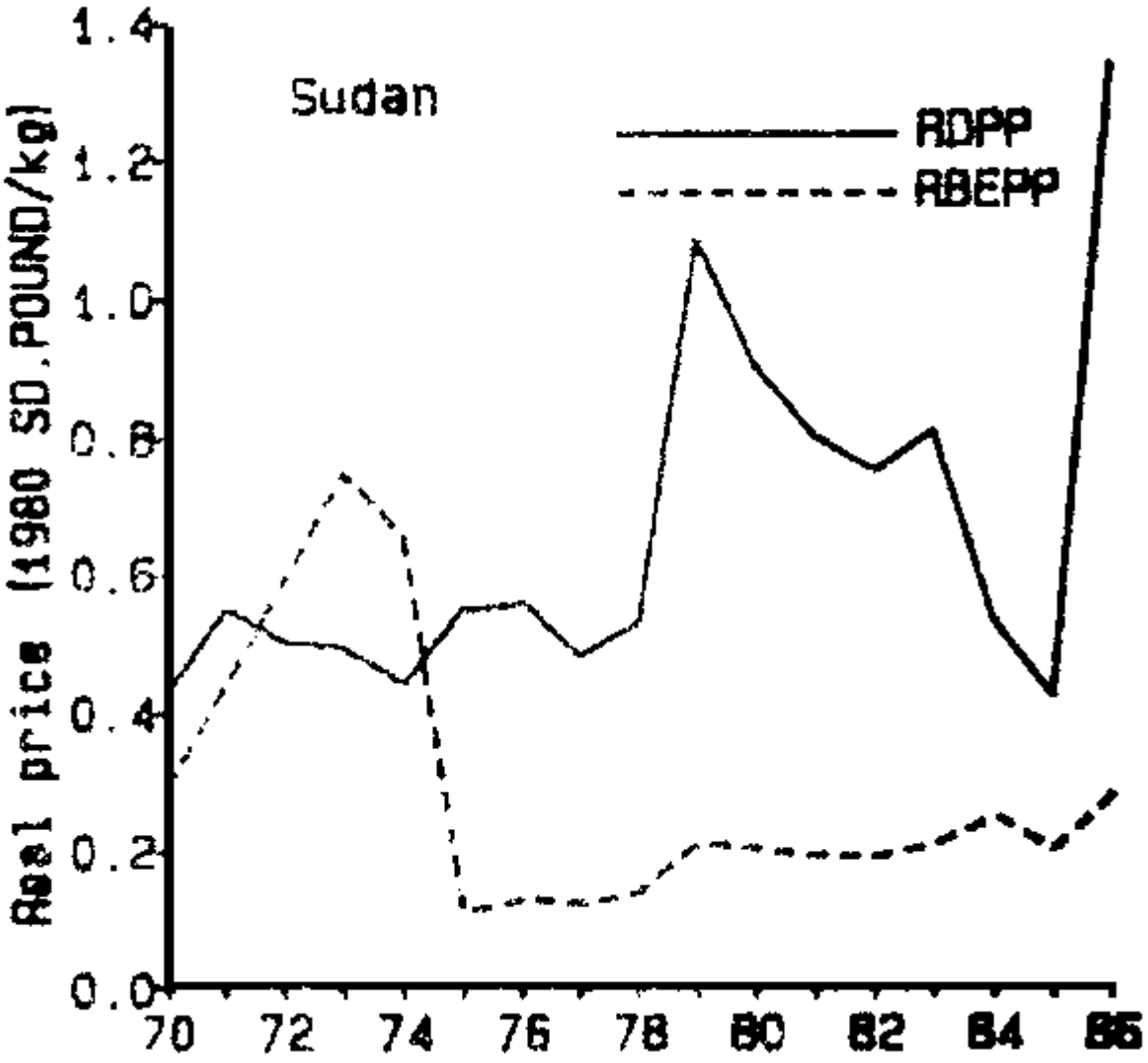
Mali


Mali
RDPP
RBEPP
Real price (1980 '000 FCFA/kg)
600
500
400
300
200
100
70
72
74
76
78
80
82
84
86

Nigeria


Nigeria
ADPP
ABEPP
Real price (1980 NAIRA/kg)
4.4
3.6
2.8
2.0
1.2
0.4
70
72
74
76
78
80
82
84
86

Sudan


Sudan
RDPP
RBEPP
Real price (1980 SD.POUND/kg)
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
70
72
74
76
78
80
82
84
86

Zimbabwe

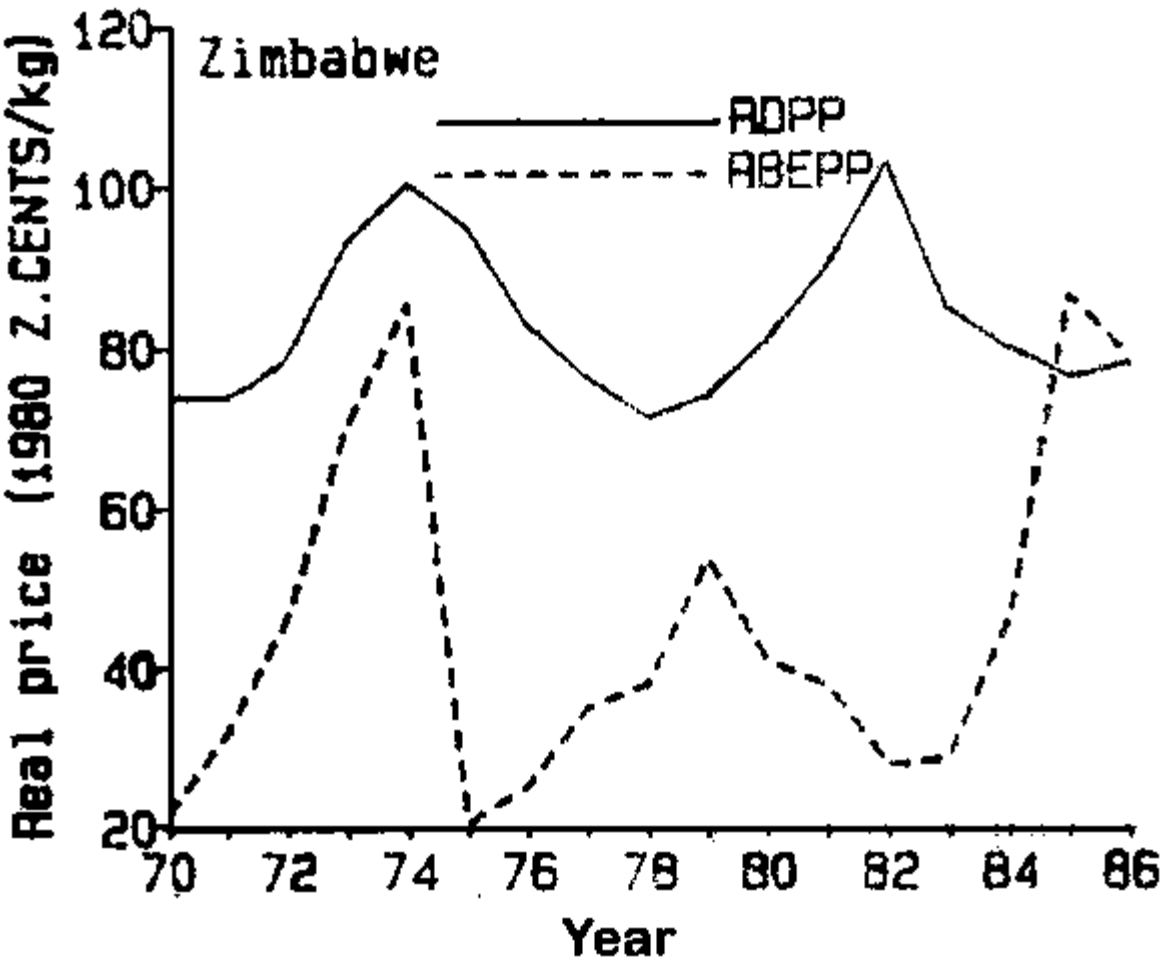
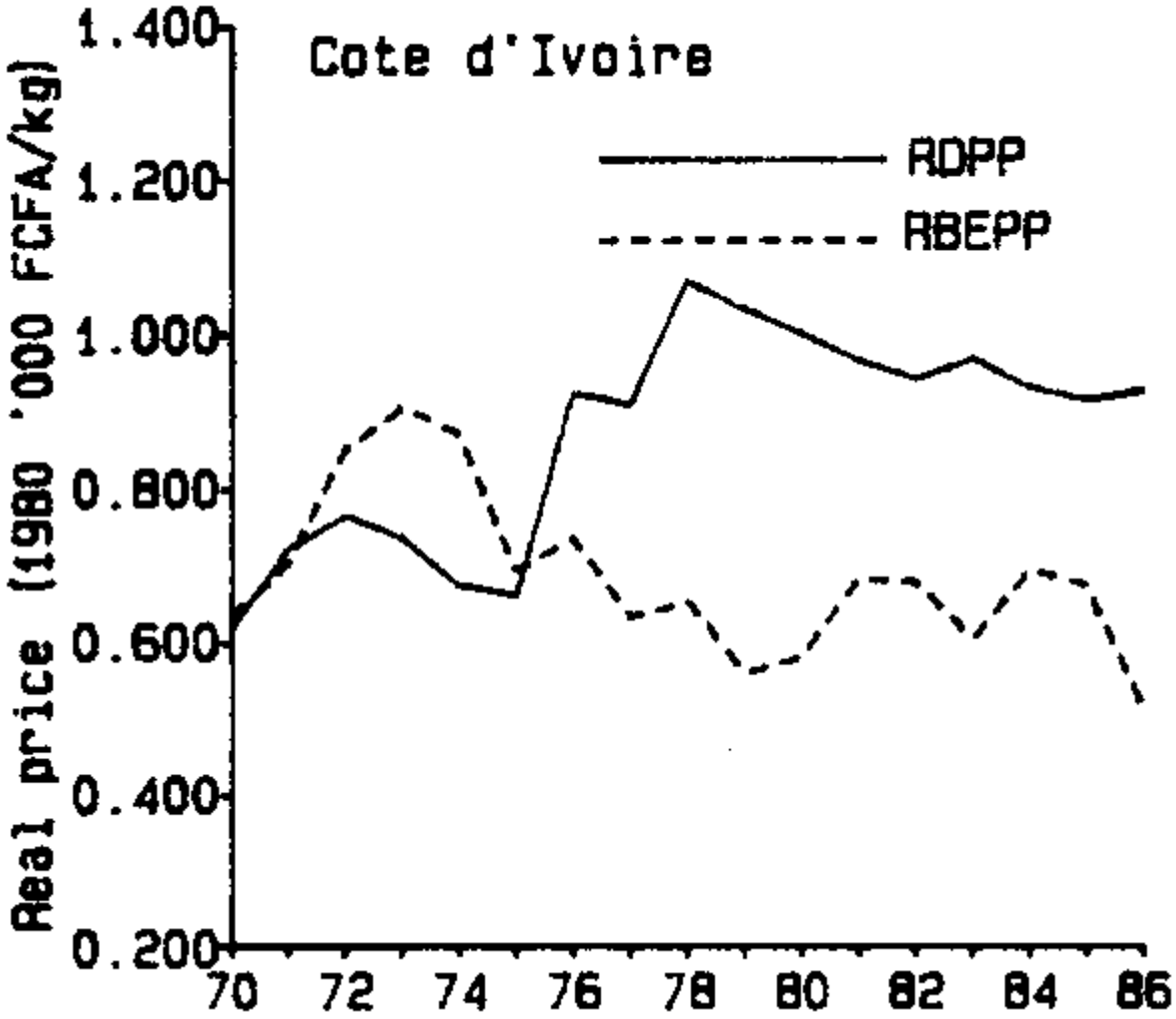
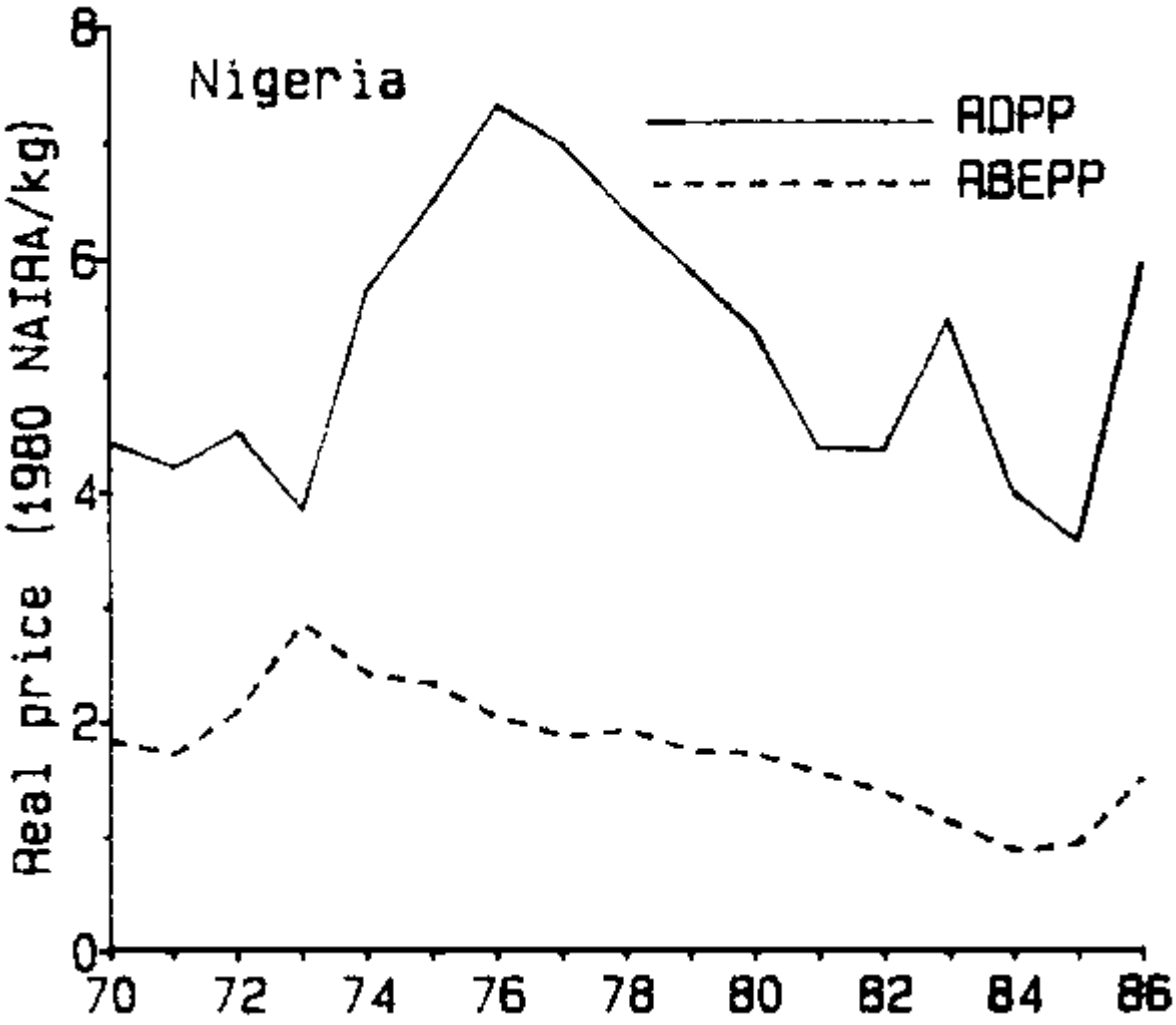

Zimbabwe
RDPP
RBEPP
Real price (1980 Z.CENTS/kg)
120
100
80
60
40
20
70
72
74
76
78
80
82
84
86
Year

Figure 2. *Comparison of real domestic and border equivalent producer prices for mutton in some of the study countries, 1970–86.*

Côte d'Ivoire



Nigeria


Nigeria
ADPP
ABEPP
Real price (1980 NAIRA/kg)
0
2
4
6
8
70
72
74
76
78
80
82
84
86

Sudan

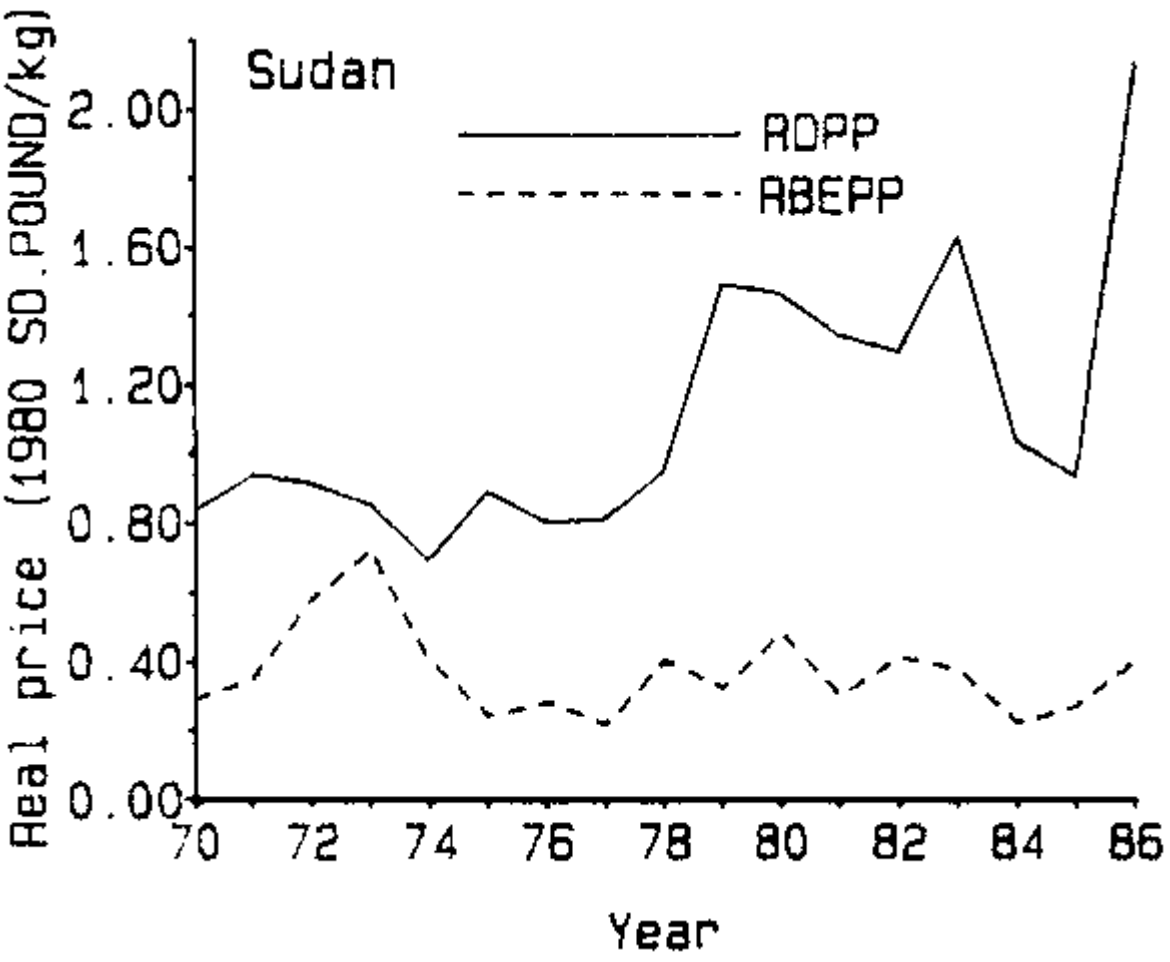
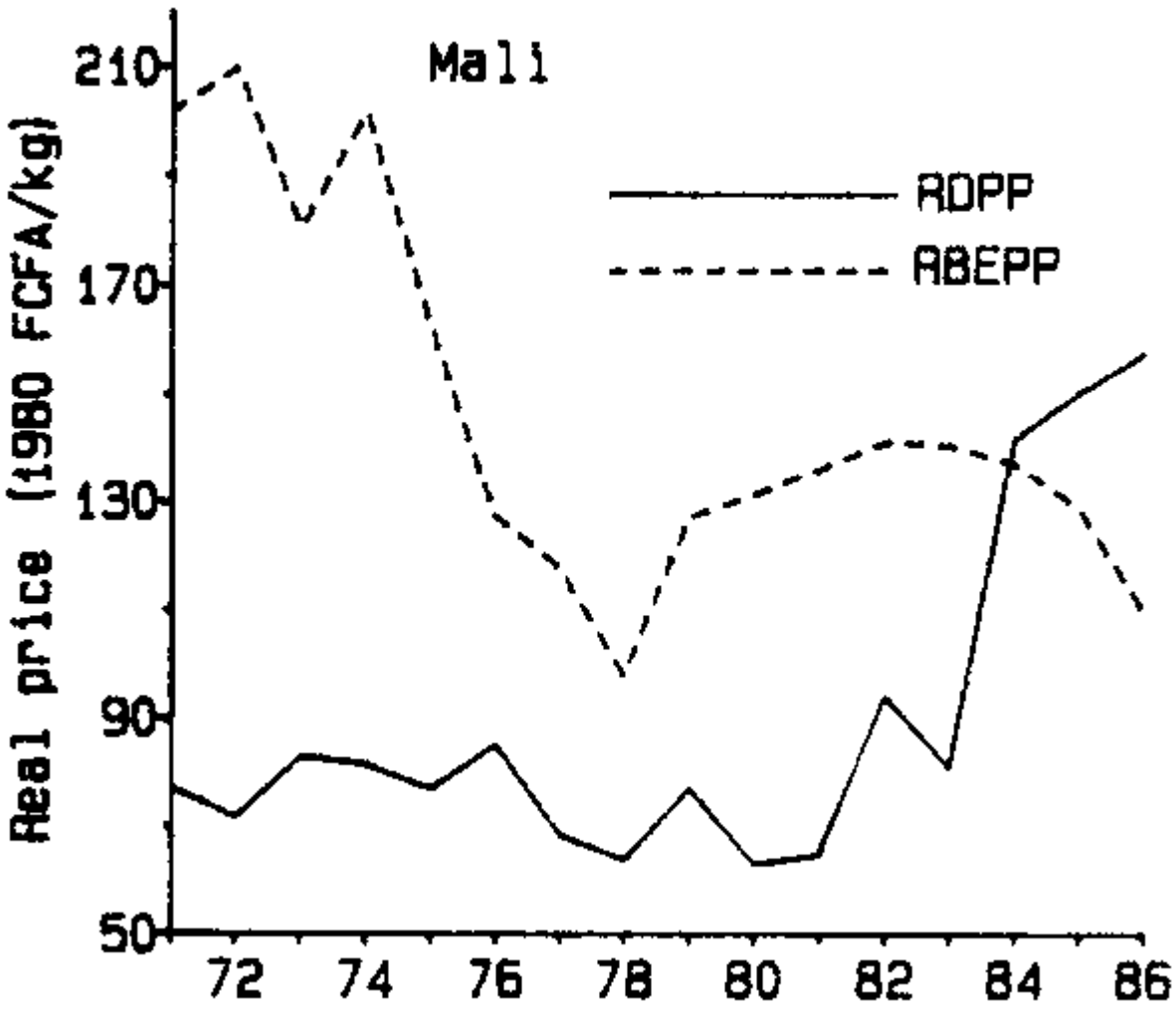
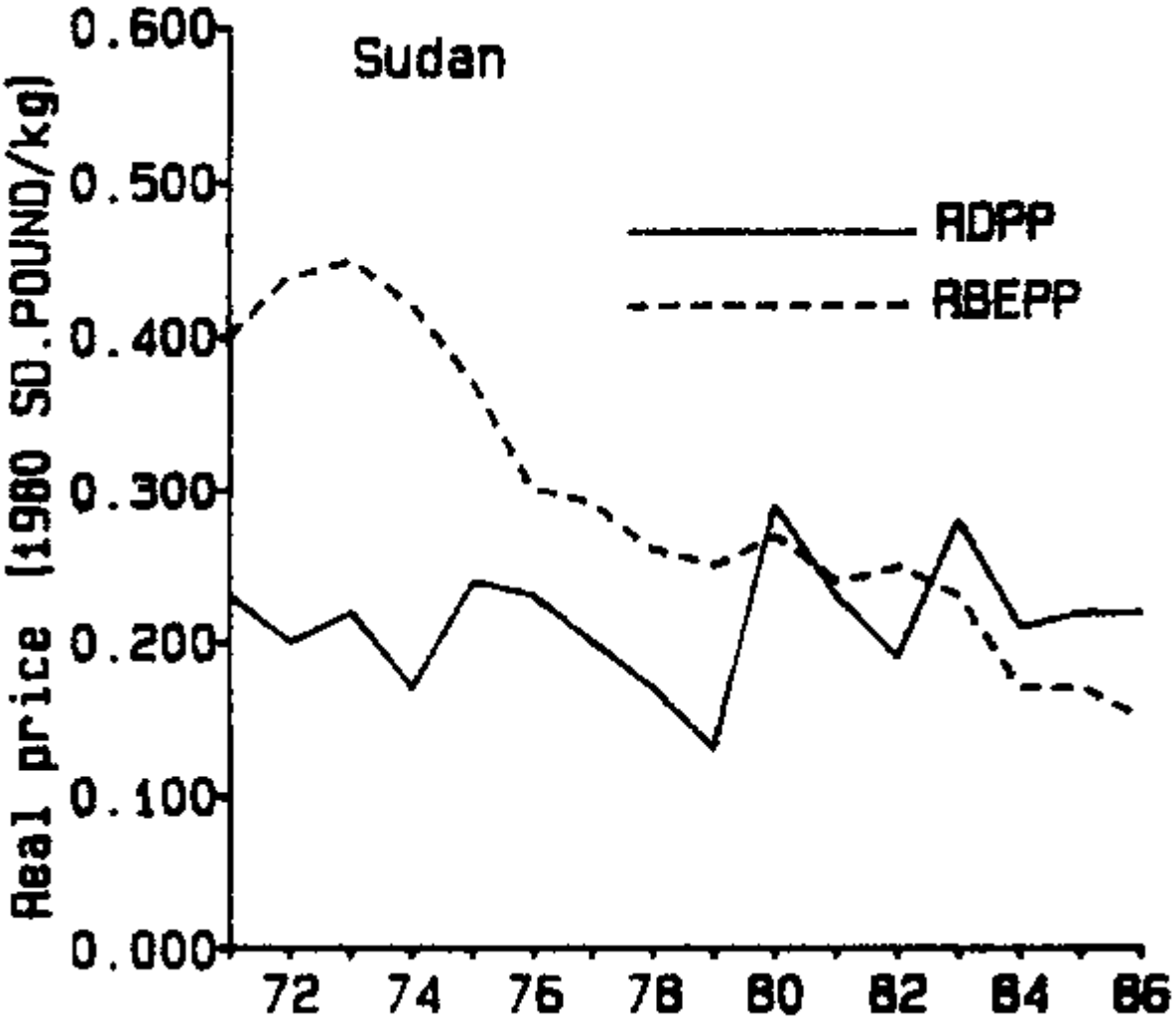


Figure 3. *Comparison of real domestic and border equivalent producer prices for milk in some of the study countries, 1971–86.*

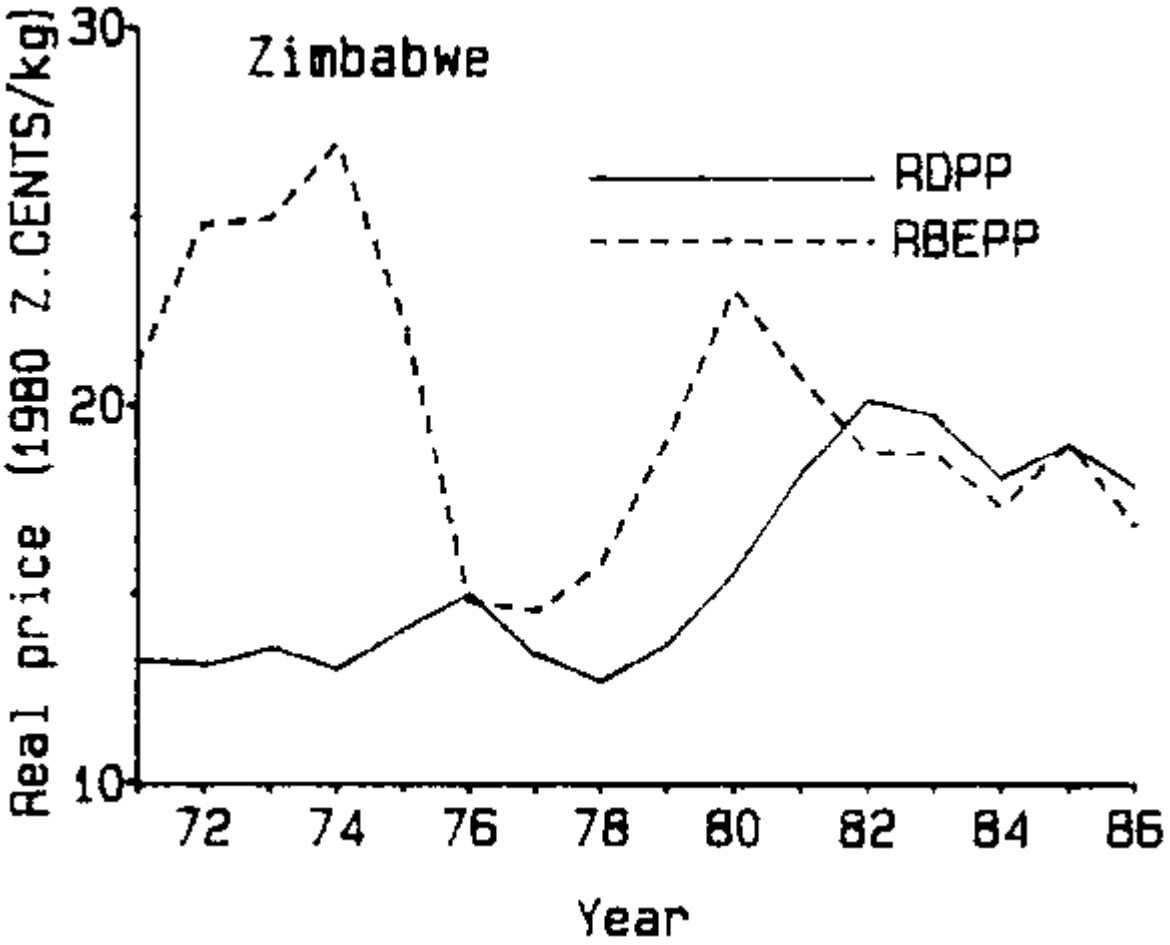
Mali


Mali
RDPP
ABEPP
Real price (1980 FCFA/kg)
210
170
130
90
50
72
74
76
78
80
82
84
86

Sudan


Sudan
Real price (1980 SD.POUND/kg)
0.600
0.500
0.400
0.300
0.200
0.100
0.000
72
74
76
78
80
82
84
86
RDPP
RBEPP

Zimbabwe



Implicit taxation (or subsidisation) of livestock producers

As noted under the discussion of real producer price trends, it appears that a certain amount of incentive has been provided to livestock producers through the rise in real producer prices of some of the commodities surveyed. Real price trends, however, provide only a partial picture of the complex interactions of sector and macroeconomic policies on production incentives. To provide a better measure of the effect of price policy interventions on production incentives, the nominal protection coefficient (NPC) – which is defined as the ratio of the domestic producer price to the border equivalent price – can be used to assess both the level of taxation against (or subsidisation of) livestock production and the scope for increasing incentives.[4] By comparing domestic producer prices to the maximum that could be offered to producers through international trade (i.e. border price less domestic marketing costs), the NPC provides an indication of the taxation (or subsidisation) rate for producers, and thus, a measure of the distortion of production incentives.[5] A NPC equal to one would indicate that at the official exchange rate the producer is obtaining the equivalent of the world price and, in this sense, is neither being taxed nor subsidised. A coefficient greater than one would suggest subsidisation, while a coefficient less than one would indicate that governments are taxing producers of the commodity in question. Given the latter situation, the scope exists for increasing price incentives by raising the domestic producer price to the same level as the border equivalent price.

4. See Appendix 1 for the full derivation of the NPC.

5. While the NPC represents a simple and straight forward measure of price incentives (or disincentives), it suffers from the disadvantage that only the product price is considered, and not the prices of inputs. More complex measures such as the Effective Protection Coefficient (EPC) and Effective Subsidy Coefficient (ESC) which take the prices of inputs into consideration require data on farm budgets which were not available in most of the study countries. In any case, given the low level of purchased inputs in ruminant livestock production in the majority of the countries studied, it is most likely that the NPC will closely approximate these other measures.

In Table 16, the estimated NPCs[6] for the producers of beef, mutton and milk are presented.[7] The results indicate that, except for beef in Côte d'Ivoire and Zimbabwe, policy measures in the study countries have implicitly subsidised livestock producers over the period covered. When the NPCs for beef and mutton are compared, the latter appear higher than the former mainly as a result of the higher domestic prices paid for sheep during religious festivals.

6. A major problem in estimating NPCs relates to the choice of an appropriate world market price to use as a reference price since a number of different world price series exist. A description of the world price series used for this study is provided in Appendix 1.

7. Since the NPCs presented in Table 16 were estimated using official exchange rates, it is to be expected that this will lead to a significant upward bias in the NPCs of those countries with overvalued exchange rates.

In explaining inter-country differences in the NPCs, it is useful to distinguish between importing and exporting countries. For the livestock products considered in Table 16, Côte d'Ivoire and Nigeria are net importers. In the case of milk, all the countries considered in Panel B of the table can be classified as net importers for most of the period covered. In these circumstances, we would expect the domestic price for these products to rise in relation to the border price because of the increasing need to import to meet the domestic deficit. This indeed occurred to some extent in most of the importing countries, with beef in Côte d'Ivoire being the only major exception.[8] If this fact is taken together with the decline in the real border equivalent producer price in these countries, we would expect the ratio of producer price to border price to rise over time for beef, mutton and milk in the importing countries. This expectation is largely confirmed by the results in Table 16. Figure 4 also shows the gradual rise in the NPCs for milk producers in Mali, Sudan and Zimbabwe.

8. Although the rise in the real producer price in some of the importing countries was statistically insignificant (as shown in Table 14), the sign of the coefficients suggest an upward trend. For mutton in Nigeria, the fall in the real producer price was small and statistically non-significant.

Table 16. *Average nominal protection coefficients for livestock producers in the study countries, selected periods.*[a]

Panel A. Beef and Mutton

Product and Country	Period		
	1970–72	1977–79	1984–86
Beef			
Côte d'Ivoire	0.99	2.24	0.97
Mali	1.33	2.68	1.08
Nigeria	1.52	2.59	2.27
Sudan	1.18	4.33	3.01
Zimbabwe	2.46	1.80	1.20
Mutton			
Côte d'Ivoire	0.97	1.64	1.50
Nigeria	2.35	3.50	4.12
Sudan	2.39	3.64	4.51

Panel B. Milk

Product and Country	Period		
	1971–73	1977–79	1984–86
Milk			
Mali	0.36	0.61	1.21
Sudan	0.51	0.60	1.32
Zimbabwe	0.58	0.81	1.04

a. NPCs were estimated using official exchange rates.

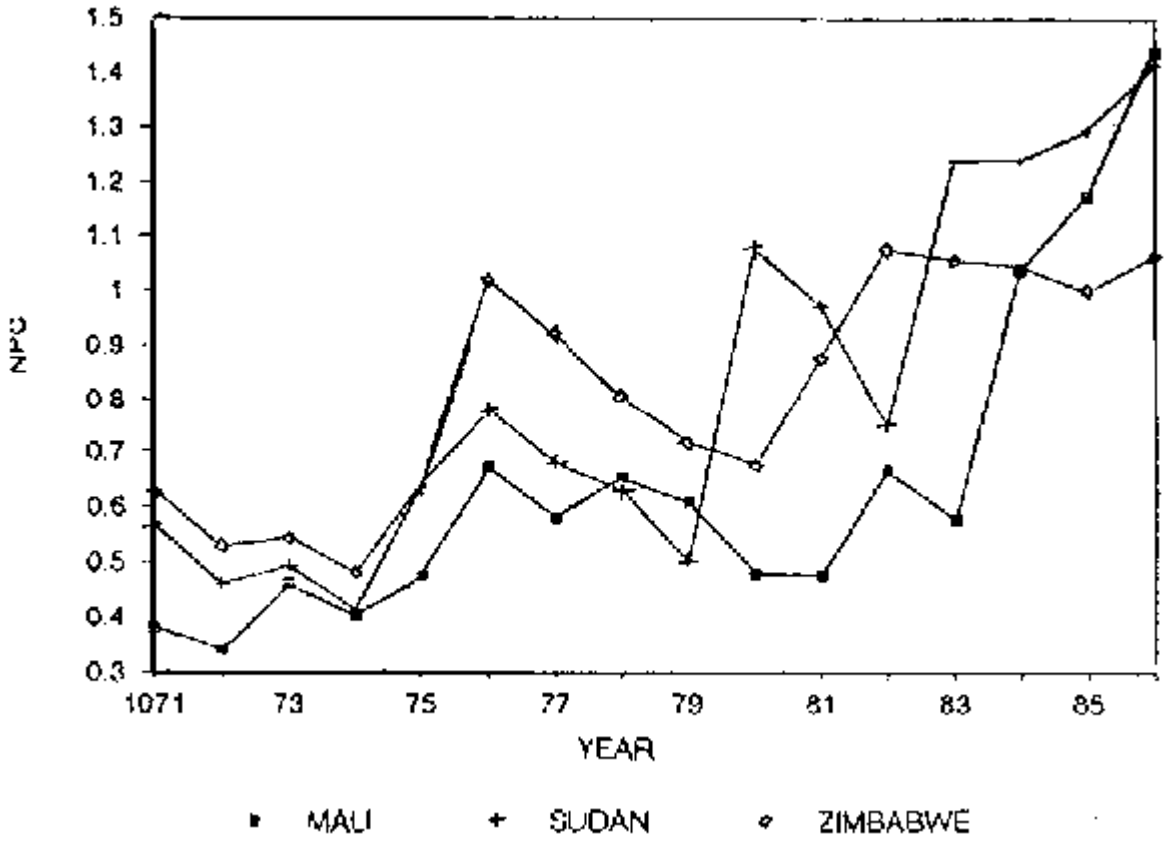
Source: Estimated from data collected from the study countries by the author.

In Mali, which is a livestock exporting country, the real border equivalent producer price for beef fell markedly between 1974 and 1975 and remained at a depressed level until about 1981 (see Figure 1). The real domestic producer price also fell but not as rapidly, thus leading to a rise in NPC over the period covered.

In Sudan, another livestock exporting country, the lucrative export market provided by the oil rich Gulf states and the frequent devaluations of the Sudanese pound from 1979 onwards indirectly led to a rise in the real producer price of meat products. At the same time that the real domestic producer price was rising, the real border equivalent price declined. The result was a substantial rise in the NPCs of beef and mutton over the period considered.

With respect to Zimbabwe, a beef exporting country, the fall in the NPC for beef, particularly between 1984–86, was caused by a rise in the real border equivalent price coupled with a moderate fall in the real domestic producer price (see Figure 1). The rise in the border price was in large part due to Zimbabwe's realistic exchange rate policy during this period. Although the nominal producer price increased between 1984–86, domestic inflation increased much faster leading to a fall in the real producer price. The overall effect of the divergent directions of these two prices was a decline in the NPC for beef.

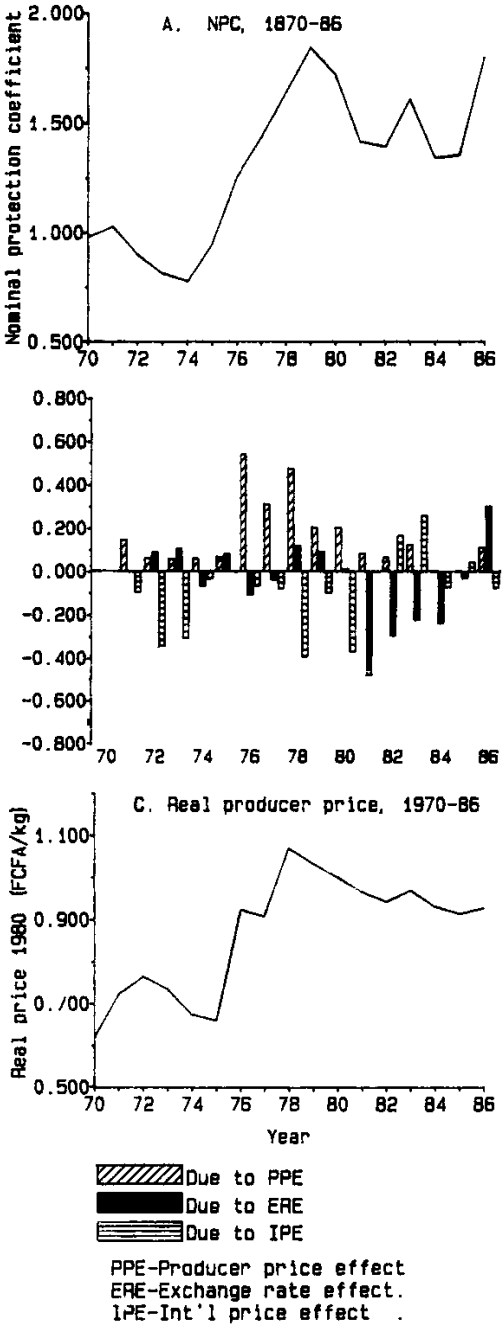
Figure 4. ***Nominal Protection Coefficients (NPCs) for Milk Producers in some of the study countries, 1971–86***



For each commodity considered above, the underlying causes of annual changes of the NPCs may be analysed by a simple decomposition. A cursory glance at the equation used to derive the NPC (see Appendix 1) will show that three variables determine the value of the NPC. These are the nominal producer price, the exchange rate and the border price. Following Jaeger and Humphreys (1988), the NPC is decomposed using a difference equation which for small changes approximates the total derivative of the NPC's three components or sources of change (see Appendix 3). Examining these changes in conjunction with trends in real price changes can help to explain the underlying pattern of changing production incentives. The NPCs for mutton and milk in Côte d'Ivoire and Mali respectively have been decomposed in the above fashion and the observed changes are explained below.

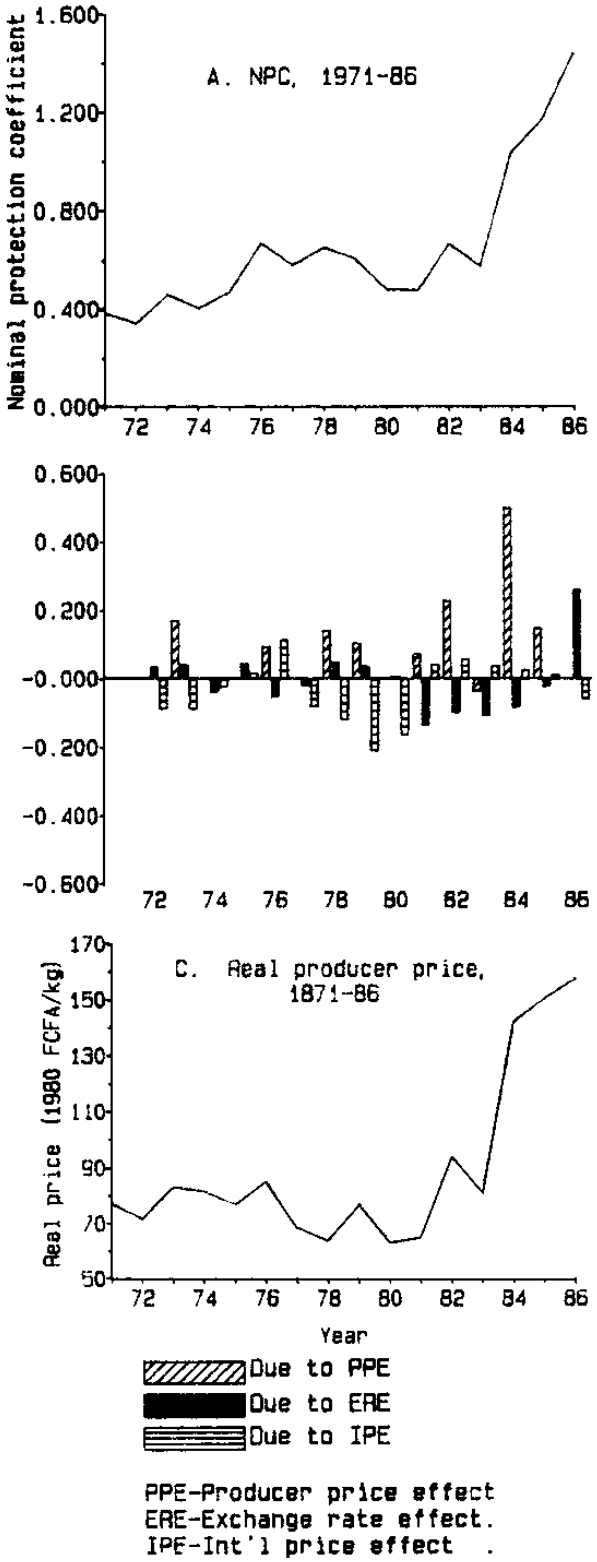
We examine first the NPC for mutton in Côte d'Ivoire which is shown in Figure 5 (Panel A). As the graph indicates, the NPC fell below one between 1971 and 1974, but rose to 1.84 in 1979 before falling to 1.38 in 1982. By 1986, it rose again to 1.79. In general, there was a move away from taxation towards subsidisation of mutton producers during this period. The decomposed annual change in the NPC is shown in Panel B. In this figure, each set of 3 bars represents the decomposed annual change in the NPC due to the 3 principal components. The three, taken together, should roughly approximate the actual change in the NPC from the previous year (Panel A). The decomposition indicates that in all years, with the exception of 1984 and 1985, changes in nominal producer prices have helped to raise the NPC, with larger magnitudes in 1976 and 1978 (see also Panel C). Rising international prices lowered the NPC between 1971–73 and 1979–80. The lowering of the NPC between 1980–82 and 1983–84 was primarily as a result of nominal devaluations which have the effect of making international prices appear higher in domestic currency terms. At the same time that border prices were going up, rising inflation caused the real producer price to drop (Panel C), thus contributing to the fall in the NPC in those years.

Figure 5. ***Annual changes in price incentives to mutton producers in Côte d'Ivoire.***



In the case of milk in Mali, the decomposition of the NPC shows that nominal producer prices remained unchanged between 1971–72 and 1973–75 with the result that changes in the NPC in those years were entirely due to exchange rate and international price changes (Figure 6, Panel B). The changes in the latter two variables were quite small and consequently the changes in the NPC were minimal. Between 1983 and 1984, a large nominal producer price increase helped to raise the NPC above the NPC values of the early 1970s. As Panel C indicates, there was also an upward trend in the real producer price around this period.

Figure 6. ***Annual changes in price incentives to milk producers in Mali.***



Overall, what these decompositions have clearly shown is that the scope for governments in the study countries to raise incentives to livestock producers depends on a number of factors including policies affecting the formation of nominal producer prices, macroeconomic policies influencing the rate of inflation and the exchange rate, and international prices. While governments can act directly to influence the first three factors, only indirect action may be possible in the case of the fourth factor. For the two francophone countries considered in the above examples, the room for manoeuvre on exchange rate management is even limited given the fact that their currencies are tied to the French Franc.

The consumer price of livestock products

As discussed in chapter 4, one prime objective of governments in the study countries is to keep the consumer price of livestock products down in order to restrain the increase in the cost of living. The results in Table 17 indicate that, with the exception of milk, governments have not been entirely successful in this respect. Although there was a statistically significant fall in the retail price of beef in Zimbabwe, for meat products in general there was a rise in retail prices. The rise in Sudan was particularly rapid. Given the fact that in some countries official rather than market prices were used and because meat shortages at times led to the development of parallel markets with meat being sold at prices higher than the official ones, the rise in meat prices could have been faster than the figures in Table 17 suggest. Table 18 also shows that retail prices have not been particularly stable over the period covered. Judging by the coefficient of variation, the fluctuations in retail prices almost parallel those of producer prices. In order to establish the extent of subsidisation (or taxation) of consumers, NPCs were also estimated for consumers. The relevant results are presented in Table 19. In the case of consumers, a NPC of less than one implies implicit subsidisation, while a coefficient greater than one means implicit taxation. For meat products, the results in Table 19 show that in the period between the early and late 1970s, there was a gradual shift away from subsidisation of consumers to taxation. The taxation of consumers continued till the mid - 1980s in most countries; the only exception being beef in Côte d'Ivoire and Zimbabwe. This result is in agreement with the trends in meat retail prices reported in Table 17. Throughout the period covered, milk consumers were subsidised in Mali, but were implicitly taxed in the remaining countries (see Figure 7). The results thus appear to indicate that in the majority of cases, the objective of keeping retail prices down for the benefit of consumers has not been fully realised. The only caveat is that the NPCs shown here may overstate the actual level of consumer taxation since the official exchange rate was used to estimate them.

Table 17. *Annual percentage growth in real consumer prices in the study countries, 1970–86.*

Product and Country	Percentage Growth Rate 1970/72 – 1984/86
Beef	
Côte d'Ivoire	1.9
Mali	1.4 ns
Nigeria	0.8 ns
Sudan	7.2
Zimbabwe	–3.9
Mutton	
Côte d'Ivoire	–0.3 ns
Mali	2.5
Nigeria	0.5 ns
Sudan	7.7
Milk[a]	
Mali	–7.5
Nigeria	–4.4
Sudan	–4.9
Zimbabwe	–2.9

ns: not statistically significant at the 0.1 level.

The annual growth rates have been estimated as log linear trends by ordinary least squares regression.

a. For milk, growth rates were estimated for the period 1972–74 to 1984–86. The milk considered here is reconstituted milk in the case of Mali; condensed and evaporated milk in the cases of Nigeria, and fresh milk in the case of Sudan and Zimbabwe.

Source: Estimated from data collected from the study countries by the author.

Table 18. *Variability in Real Consumer Prices in the Study Countries, 1970–86.*

Product and Country	Standard deviation	Coefficient of variation
Beef		
Côte d'Ivoire	64.6	9.8
Mali	79.6	16.9
Nigeria	0.7	20.8
Sudan	0.5	35.9
Zimbabwe	22.4	23.1
Mutton		
Côte d'Ivoire	114.8	12.9
Mali	109.4	18.3
Nigeria	0.4	12.7
Sudan	0.7	36.4
Milk[a]		
Mali	40.6	36.5
Nigeria	0.6	35.9
Sudan	0.1	28.9
Zimbabwe	2.9	11.8

a. The period considered for milk was 1972–86. The different types of milk considered in this table are similar to those in table 17 (see note under table 17).

Source: Estimated from data collected from the study countries by the author.

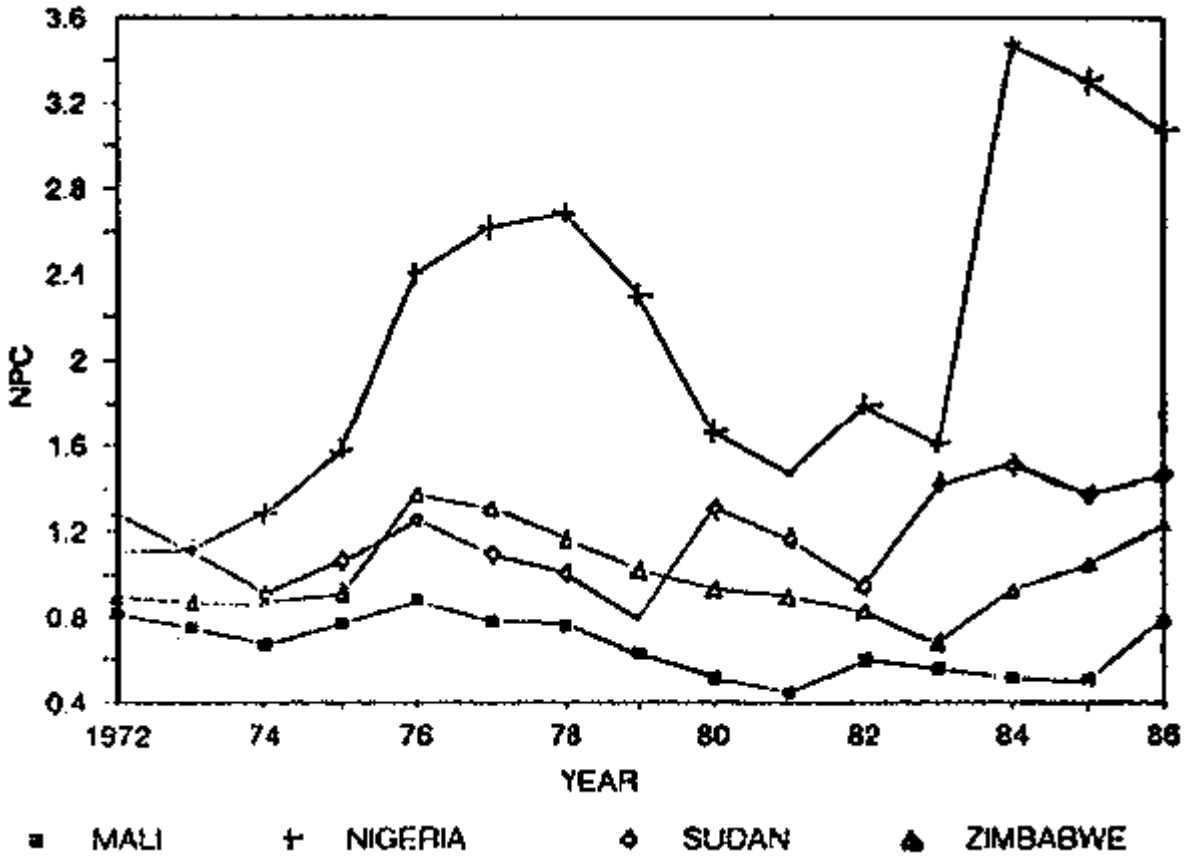
Table 19. *Average nominal protection coefficients for consumers in the study countries, selected periods*[a]

Panel A. Beef and Mutton			
Product and Country	Period		
	1970–72	1977–79	1984–86
Beef			
Côte d'Ivoire	0.56	1.06	0.74
Mali	0.79	1.84	1.12
Nigeria	0.83	1.28	1.26
Sudan	0.51	1.06	1.40
Zimbabwe	0.98	1.18	0.59
Mutton			
Côte d'Ivoire	0.98	0.87	1.11
Mali	0.54	0.87	0.79
Nigeria	0.83	0.95	1.15
Sudan	0.80	0.95	2.02
Panel B. Milk			
Product and Country	Period		
	1972–73	1977–79	1984–86
Milk			
Mali	0.78	0.72	0.59
Nigeria	1.11	2.53	3.27
Sudan	1.16	0.97	1.45
Zimbabwe	0.88	1.16	1.06

a. NPCs were estimated using the official exchange rates.

Source: Estimated from data collected from the study countries by the author.

Figure 7. ***Nominal Protection Coefficients (NPCs) for Milk Consumers in some of the study countries, 1972–86***



Concluding remarks

This study has examined the objectives and instruments of livestock pricing policies in a selected sample of SSA countries. A major objective of the study has been to provide a cross-country comparison of the effects of livestock pricing policies on production incentives. Based on the findings of this study, it appears that since the early 1980s there has been a reduction in the level of price discrimination against livestock producers in the study countries. This reduction in taxation has come about through the institution of a variety of direct and indirect policy measures and represents an improvement over the situation in the 1970s.

However, there still exist an enormous scope for improving price incentives in the study countries. Ordinarily, some of the measures already instituted such as liberalization of agricultural marketing and devaluation can help to raise real price incentives. But these measures will have the desired effect only to the extent that they are not offset by increased domestic inflation. If governments are able through appropriate fiscal and monetary policies to reduce inflation, this can serve to support and strengthen the other more direct measures aimed at

improving real price incentives. This implies that macroeconomic policies and direct measures designed to raise price incentives need to be closely coordinated if they are to provide maximum benefit to livestock producers. Ultimately, it is the effectiveness of such coordination that will determine the degree of success that governments can hope to achieve in their quest to maintain and increase real producer price incentives in the study countries and elsewhere in SSA.

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Appendices

Appendix 1. Price data sources, limitations and estimation methods

Data sources

The time-series data on official and market prices that were utilized for the analysis presented in chapter four were collected from the study countries during 1988. Each study country, apart from Ethiopia, was visited for two weeks in order to confer with policy makers and scientists familiar with the livestock sub-sector and to obtain copies of existing documents and studies relating to the sector. These documents, amongst other things, provided the data that were utilized to estimate transport and processing costs in those instances where these costs were not directly provided by marketing agencies in the study countries. The data collected during field visits were also supplemented with published statistics on world prices, ocean freight rates, exchange rates and consumer price indices from a variety of sources including the FAO Monthly Bulletin of Statistics, ILO (1981 and 1988), IMF (1987), and World Bank (1986).

Data limitations

Although attempts were made to improve upon the data used for the analysis, there are various limitations to them. In the first instance, the producer price series available in some countries refer to intermediate market (i.e. market between rural and urban centres), rather than farm-gate prices. In such cases, various deductions may be required to arrive at actual farm-gate prices. These deductions relating to transport and marketing charges were made in those instances where there was sufficient information to do so. However, in other cases, rather than make deductions on the basis of inadequate information, no attempt was made to adjust the intermediate market prices.

Secondly, the consumer prices used for the analysis refer to retail prices in the capital cities. Rural retail prices have been largely ignored and in any case were mostly unavailable. In some cases, official retail prices were used where market prices were unavailable. The use of official retail prices may, however, give a misleading picture as to the actual changes in market prices of the products considered. Overall, these limitations imply that caution needs to be exercised in interpreting the results reported in the text.

Border equivalent prices

Border equivalent prices, or world prices adjusted for transport, marketing and processing costs, were estimated to serve as yardsticks and to provide an indication of the extent to which domestic prices have been distorted by government intervention. For an imported commodity, the border price was computed by taking the appropriate international price and adding on to it ocean freight and insurance charges to obtain the c.i.f. price which was then converted into domestic currency at the official exchange rate. To this price was added handling, transport and marketing charges from the border to the domestic market to arrive at the equivalent market price for the imported commodity. From the latter, transport, processing and marketing charges

from the farm to the market were deducted to obtain the border equivalent producer price at the farm gate. Algebraically, the border equivalent producer price at the farm gate for an imported commodity is thus:

$$P_b = (P_w + T_w) + T_d - C_d$$

where:

P_b is the border equivalent producer price at the farmgate
P_w is the world price
T_w represents ocean freight and insurance charges
$(P_w + T_w)$ represents the c.i.f. price which was converted to domestic currency at the official exchange rate
T_d represents handling, transport and marketing charges from port to domestic market
C_d represents transport, processing and marketing charges from farmgate to domestic market.

For an export commodity, the border equivalent producer price at the farm-gate was derived in a slightly different way. In this case, ocean freight and insurance charges were deducted from the world price to give the f.o.b. border price. From the latter, transport, processing and marketing charges from the farm to the domestic market were deducted and the value of by-products added to arrive at the border equivalent producer price. In symbols:

$$P_b = P_w - T_w - T_d - C_d + V_b$$

where: V_b is the value of by-products.

In all cases, the reference market was assumed to be the largest city - usually the capital city.

However, the case of Mali deserves special mention. Although Mali was classified as an exporter, the border equivalent price for Malian producers was not estimated as explained above. The land locked nature of the country and the fact that Mali's traditional export market had always been Côte d'Ivoire necessitated a different approach. Thus, for beef and mutton in Mali, the border equivalent price was estimated by using c.i.f. price in Abidjan port rather than P_W as the starting point of the analysis - the assumption being that Abidjan is the place where beef from Mali will have to compete with imported beef.

Also at this point, it is worthwhile to briefly examine the world market prices used in this study as reference prices. Due to the existence of a number of widely differing world price series for livestock products, it is difficult to find a single price series that will be adequate for all purposes, i.e. that will take into account the specificity of meat grades as well as the diversity that exists between different types of exporters on the one hand, and between importers and exporters on the other hand. Nevertheless, to provide a common basis for comparison between countries, for each product considered in the study (e.g. beef) the same world price was used for all the study countries. This approach suffers from the shortcoming of not adequately recognising the regional trade flows among neighbouring countries (this was taken into consideration in the case of Mali as discussed above), but it is justified in the sense that it provides a common basis

for comparison among all the study countries and reflects better the extent of distortion of domestic prices.

Thus for beef, Argentinean f.o.b. prices for frozen boneless beef were used. These were converted into carcass weight equivalent prices for the estimation of border equivalent producer prices. For mutton, London wholesale prices for New Zealand lamb were used. Both prices were taken from the IMF Financial Statistical Yearbook. The world price for reconstituted milk was obtained as a composite of the prices of skim milk powder and butter-oil. Both prices were taken from various issues of the FAO Commodity Review and Food Outlook.

The Estimation of Real Prices

Throughout chapter four, real prices have been computed by using the consumer price index (CPI) to deflate actual producer and consumer prices. The CPI was used as a deflator of nominal producer prices in order to estimate the producer's real purchasing power and its incentive (or disincentive) effect on livestock production. For the same set of prices the producer price index (PPI) could have been used, instead of the CPI, to give an idea of the net return to livestock production vis-a-vis other agricultural production activities. However, the CPI was the only readily available and most consistent price series in all the countries studied. The analysis was, therefore, confined to the use of the CPI alone.

The CPI published in the IMF International Financial Statistics Yearbook was used for each country, except Mali. In the case of Mali, a CPI did not exist prior to 1988. The ILO Yearbook of Labour Statistics, however, contains a food price index (FPI) for Mali and this was used to deflate nominal prices in that country.

Real border prices were computed by deflating nominal border prices (obtained as explained above) by the CPI or the FPI in the Malian case.

The Nominal Protection Coefficient

The nominal protection coefficient (NPC) measures the extent to which domestic prices diverge from border equivalent prices. For producer prices, it was estimated as follows:

$$NPC = P_d / P_b$$

where:

P_d is the domestic producer price; and
P_b is the border equivalent producer price computed as explained above.

Appendix 2. Variability in real domestic and border equivalent producer prices

Panel A 1970–78				
Product and country	Real domestic producer price		Border equivalent producer price in real domestic terms	
	S.D.	C.V.	S.D.	C.V.
Beef				
Côte d'Ivoire	54.6	10.1	215.3	49.2
Mali	61.2	11.2	168.6	47.8
Nigeria	0.9	28.5	0.4	22.8
Sudan	0.1	9.5	0.3	71.4
Zimbabwe	10.8	13.1	22.5	53.8
Mutton				
Côte d'Ivoire	149.2	18.9	106.6	14.4
Nigeria	1.3	23.8	0.4	17.1
Sudan	0.1	9.5	0.2	43.4
Cow's Milk[a]				
Mali	7.5	9.9	43.3	26.7
Sudan	0.1	13.1	0.1	20.1
Zimbabwe	0.7	5.5	5.0	24.3
Panel B 1979–86				
Beef				
Côte d'Ivoire	37.9	7.8	102.7	28.6
Mali	66.9	16.3	81.6	32.1
Nigeria	0.5	17.2	0.3	19.7

Sudan	0.3	35.2	0.1	14.8
Zimbabwe	9.4	11.2	21.9	43.8
Mutton				
Côte d'Ivoire	40.2	4.2	67.1	10.8
Nigeria	0.9	18.6	0.3	25.2
Sudan	0.4	26.3	0.1	24.4
Cow's Milk				
Mali	39.8	38.3	10.3	7.8
Sudan	0.1	22.7	0.1	21.1
Zimbabwe	2.2	12.2	2.0	10.3

S.D. - Standard Deviation and C.V. - Coefficient of Variation

a. For milk, the period considered was 1971–78

Source: Estimated from data collected from the study countries.

Appendix 3. Decomposition of the NPC

The annual change in the nominal protection coefficient (NPC) can be decomposed into its component parts using a difference equation (Jaeger and Humphreys, 1988). If we start with the basic NPC equation, i.e.

$$NPC_t = P_t^d / (E_t P_t^w)$$

where P_t^d is the domestic producer price for a given commodity,

E_t is the official exchange rate, and P_t^w is the border equivalent price for the commodity, all for period t. The total derivative for the above is :

$$dNPC = (1 / EP^w)dP^d - (P^d / (E^2 P^w))dE - (P^d / (EP^{w2}))dP^w$$

which for small changes is approximated with first differences by:

$$NPC_{t+1} - NPC_t = (P^d{}_{t+1} - P_t{}^d) / (E_t P_t{}^w)$$

$$- (E_{t+1} - E_t) P_t{}^d / (P_t{}^w E_t{}^2)$$

$$- (P^w{}_{t+1} - P_t{}^w) P_t{}^d / (E_t P_t{}^{w2})$$

Appendix 4. Tables on nominal and real producer and consumer prices and border equivalent prices in some of the study countries, 1970–86.

Table 1. *Nominal producer prices for beef in the study countries, 1970–86.*

	Côte d'Ivoire	Mali	Nigeria	Sudan	Zimbabwe
Year	CFA/kg cw	CFA/kg cw	Naira/kg cw	Pound/kg cw	Cents/kg cw
1970	146	155	0.52	0.09	35.66
1971	156	176	0.57	0.12	36.76
1972	177	201	0.63	0.12	40.38
1973	198	229	0.82	0.14	49.35
1974	219	254	1.05	0.15	56.82
1975	271	288	1.86	0.24	58.96
1976	332	291	2.30	0.25	57.00
1977	338	328	2.82	0.24	57.91
1978	417	348	2.86	0.32	57.26
1979	433	407	3.30	0.87	70.46
1980	520	473	3.30	0.90	81.11
1981	558	456	3.78	1.00	102.08
1982	594	483	3.95	1.18	129.19
1983	604	509	4.68	1.67	130.42
1984	520	444	5.31	1.46	147.98
1985	604	486	5.36	1.66	153.30
1986	667	658	8.82	6.57	179.83

Sources: Côte d'Ivoire - Ministère de la Production Animale (1983, 1987)

Mali - OMBEVI. Statistiques du bétail et de la viande (various issues)

Nigeria - Nig. Livestock Information Service (various issues) and FLD (computer printouts)

Sudan - Ministry of Agriculture and Natural Resources (1985) and LMMC (computer printouts)

Zimbabwe - Agric. Marketing Authority (1980,1986)

Table 2. *Real producer prices for beef in the study countries, 1970–86.*

Year	*Côte d'Ivoire*	*Mali*	*Nigeria*	*Sudan*	*Zimbabwe*
	CFA/kg cw	*CFA/kg cw*	*Naira/kg cw*	*Pound/kg cw*	*Cents/kg cw*
1970	452.15	591.66	2.18	0.43	73.68
1971	490.57	558.97	2.06	0.55	73.67
1972	554.69	591.70	2.22	0.50	78.71
1973	558.69	521.87	2.73	0.49	93.29
1974	526.57	567.22	3.11	0.44	100.74
1975	584.68	606.95	4.12	0.55	94.94
1976	639.08	568.17	4.18	0.56	82.73
1977	510.73	511.70	4.22	0.48	76.20
1978	557.56	407.49	3.51	0.53	71.31
1979	496.50	496.95	3.63	1.09	74.25
1980	520.00	473.00	3.30	0.90	81.11
1981	512.73	406.60	3.13	0.80	90.18
1982	508.52	420.51	3.04	0.75	103.19
1983	488.36	403.89	2.92	0.81	84.63
1984	403.13	312.68	2.37	0.53	79.90
1985	459.77	316.62	2.27	0.42	76.31
1986	476.05	448.84	3.70	1.34	78.29

Note: The consumer price indices used to deflate actual prices have 1980 as the base year, thus, all prices in the table are in terms of 1980 values.

Sources: Same as Table 1 and ILO (1981, 1988), IMF (1987).

Table 3. *Border equivalent producer prices for beef in the study countries, 1970–86.*

Year	Côte d'Ivoire	Mali	Nigeria	Sudan	Zimbabwe
	CFA/kg cw	CFA/kg cw	Naira/kg cw	Pound/kg cw	Cents/kg cw
1970	131.27	103.88	0.31	0.06	10.51
1971	164.68	135.96	0.38	0.09	15.97
1972	194.74	165.21	0.46	0.14	23.84
1973	243.13	208.47	0.70	0.21	37.31
1974	319.05	280.38	0.76	0.23	48.31
1975	111.59	91.64	0.75	0.05	12.75
1976	134.95	111.46	0.88	0.06	17.54
1977	172.56	137.42	1.03	0.06	26.82

1978	141.57	112.09	1.06	0.08	30.71
1979	236.66	159.27	1.40	0.17	51.03
1980	242.38	151.80	1.39	0.20	40.76
1981	273.45	173.84	1.40	0.23	42.72
1982	390.38	285.17	1.66	0.29	34.78
1983	459.56	346.78	1.84	0.43	44.57
1984	623.92	503.14	2.18	0.68	85.92
1985	665.94	540.27	2.45	0.79	174.22
1986	576.54	447.64	4.05	1.38	180.71

Note: Border prices have been converted at official exchange rates

Sources: IMF (1987), World Bank (1986) and data collected from the study countries.

Table 4. *Real border equivalent producer prices for beef in the study countries, 1970–86.*

Year	Côte d'Ivoire	Mali	Nigeria	Sudan	Zimbabwe
	CFA/kg cw	CFA/kg cw	Naira/kg cw	Pound/kg cw	Cents/kg cw
1970	406.53	397.55	1.29	0.29	21.71
1971	517.86	431.07	1.38	0.44	32.00
1972	610.28	486.34	1.62	0.59	46.47
1973	686.03	474.87	2.34	0.75	70.53
1974	767.13	625.71	2.24	0.65	85.66
1975	240.76	193.13	1.66	0.11	20.53
1976	259.77	217.40	1.59	0.13	25.46
1977	260.74	214.38	1.55	0.12	35.29
1978	189.29	131.25	1.31	0.14	38.24
1979	271.37	194.47	1.54	0.21	53.77
1980	242.38	151.80	1.40	0.20	40.76
1981	251.26	154.94	1.16	0.19	37.74
1982	334.20	248.41	1.28	0.19	27.78
1983	371.57	275.00	1.15	0.21	28.92
1984	483.70	354.32	0.97	0.25	46.39
1985	506.92	352.20	1.04	0.20	86.72
1986	411.49	305.35	1.70	0.28	78.67

Notes: (i) Border prices have been converted at official exchange rates.

(ii) The consumer price indices used to deflate nominal border prices have 1980 as the base year, thus, all prices in the table are in terms of 1980 values.

Sources: Same as Table 3 and ILO (1981,1988).

Table 5. *Nominal producer prices for mutton in the study countries, 1970–86.*

Year	Côte d'Ivoire	Nigeria	Sudan
	CFA/kg cw	Naira/kg cw	Pound/kg cw
1970	200	1.05	0.18
1971	230	1.16	0.20
1972	244	1.28	0.22
1973	260	1.15	0.23
1974	280	1.94	0.24
1975	305	2.93	0.38
1976	480	4.03	0.35
1977	600	4.67	0.41
1978	800	5.20	0,58
1979	900	5.36	1.19
1980	1000	5.36	1.46
1981	1050	5.25	1.67
1982	1100	5.64	2.01
1983	1200	8.77	3.34
1984	1200	8.88	2.83
1985	1200	8.36	3.73
1986	1300	14.19	10.49

Sources: Côte d'Ivoire - Ministère de la Production Animale (1983,1987)

Nigeria - Nig. Livestock Information Service (various issues) and FLD (computer printouts)

Sudan - Ministry of Agriculture and Natural Resources (1985) and LMMC (computer printouts)

Table 6. *Real producer prices for mutton in the study countries, 1970–86.*

Year	Côte d'Ivoire	Nigeria	Sudan
	CFA/kg cw	Naira/kg cw	Pound/kg cw
1970	619.39	4.41	0.84
1971	723.27	4.20	0.94
1972	764.65	4.51	0.91
1973	733.63	3.83	0.85
1974	673.24	5.74	0.69
1975	658.04	6.49	0.89
1976	923.96	7.32	0.80
1977	906.62	6.98	0.81
1978	1069.66	6.39	0.95
1979	1031.99	5.89	1.49
1980	1000.00	5.36	1.46
1981	964.81	4.35	1.34
1982	941.70	4.33	1.29
1983	970.25	5.47	1.63
1984	930.30	3.97	1.03
1985	913.45	3.54	0.93
1986	927.84	5.95	2.13

Note: The consumer price indices used to deflate actual prices have 1980 as the base year, thus, all prices in the table are in terms of 1980 values.

Sources: Same as Table 5 and ILO (1981,1988) and IMF (1987).

Table 7. *Border equivalent producer prices for mutton in the study countries, 1970–86.*

Year	Côte d'Ivoire	Nigeria	Sudan
	CFA/kg cw	Naira/kg cw	Pound/kg cw
1970	204.22	0.43	0.06
1971	223.54	0.47	0.07
1972	271.66	0.59	0.14
1973	320.84	0.86	0.20
1974	361.79	0.82	0.14
1975	321.49	1.05	0.10

1976	382.26	1.12	0.12
1977	418.26	1.25	0.11
1978	488.18	1.56	0.24
1979	488.35	1.57	0.25
1980	581.57	1.70	0.48
1981	743.55	1.86	0.37
1982	791.39	1.78	0.64
1983	745.54	1.78	0.76
1984	894.54	1.93	0.59
1985	884.28	2.19	1.09
1986	723.49	3.58	1.96

Note: Border prices have been converted at official exchange rates.

Sources: IMF (1987), World Bank (1986) and data collected from the study countries.

Table 8. *Real border equivalent producer prices for mutton in the study countries, 1970–86.*

Year	Côte d'Ivoire	Nigeria	Sudan
	CFA/kg cw	Naira/kg cw	Pound/kg cw
1970	632.46	1.82	0.29
1971	702.96	1.70	0.35
1972	851.33	2.09	0.58
1973	905.30	2.85	0.72
1974	869.90	2.41	0.40
1975	693.61	2.32	0.24
1976	735.82	2.03	0.28
1977	632.00	1.86	0.21
1978	652.73	1.92	0.40
1979	559.97	1.73	0.32
1980	581.57	1.70	0.48
1981	683.22	1.54	0.30
1982	677.50	1.37	0.41
1983	602.80	1.11	0.37
1984	693.50	0.86	0.22
1985	673.12	0.93	0.27
1986	516.37	1.50	0.40

Notes: (i) Border prices have been converted at official exchange rates.

(ii) The consumer price indices used to deflate nominal border prices have 1980 as the base year, thus, all prices in the table are in terms of 1980 values.

Sources: Same as Table 7.

Table 9. *Nominal producer prices for milk in the study countries, 1971–86.*

Year	Mali	Sudan	Zimbabwe
	CFA/kg	Pound/kg	Cent/kg
1971	24.27	0.05	6.58
1972	24.27	0.05	6.71
1973	36.41	0.06	7.18
1974	36.41	0.06	7.31
1975	36.41	0.10	8.72
1976	43.69	0.10	10.33
1977	43.69	0.10	10.16
1978	54.37	0.10	10.16
1979	63.11	0.10	12.96
1980	63.11	0.29	15.54
1981	72.82	0.29	20.55
1982	108.01	0.29	25.22
1983	101.94	0.58	30.38
1984	201.94	0.58	33.43
1985	231.07	0.87	38.12
1986	231.07	1.07	40.96

Sources: Mali - ULB (personal communication)

Sudan - Animal Production Corp. and Kuku Dairy Production Cooperative (personal communication)

Zimbabwe - Agric. Marketing Authority (1980,1986)

Table 10. *Real producer prices for milk in the study countries, 1971–86.*

	Mali	Sudan	Zimbabwe
Year	CFA/kg	Pound/kg	Cent/kg
1971	76.95	0.23	13.19

1972	71.44	0.20	13.08
1973	82.94	0.22	13.57
1974	81.25	0.17	12.96
1975	76.73	0.24	14.04
1976	85.22	0.23	14.99
1977	68.16	0.20	13.37
1978	63.66	0.17	12.65
1979	77.06	0.13	13.66
1980	63.11	0.29	15.54
1981	64.90	0.23	18.15
1982	94.08	0.19	20.14
1983	80.84	0.28	19.71
1984	142.21	0.21	18.05
1985	150.63	0.22	18.97
1986	157.62	0.22	17.83

Note: The consumer price indices used to deflate actual prices have 1980 as the base year, thus, all prices in the table are in terms of 1980 values.

Sources: Same as Table 9 and ILO (1981,1988), IMF (1987).

Table 11. *Border equivalent producer prices for milk in the study countries, 1971–86.*

	Mali	Sudan	Zimbabwe
Year	CPA/kg	Pound/kg	Cents/kg
1971	63.63	0,08	10.48
1972	71.29	0.10	12.74
1973	79.20	0.12	13.20
1974	90.40	0.15	15.19
1975	77.02	0.16	13.85
1976	65.17	0.13	10.15
1977	75.31	0.15	11.03
1978	83.42	0.16	12.63
1979	104.33	0.20	18.13
1980	131.63	0.27	23.05
1981	153.33	0.30	23.48
1982	162.52	0.39	23.47

1983	177.44	0.47	28.77
1984	194.85	0.47	31.99
1985	197.27	0.68	38.14
1986	160.71	0.75	38.55

Note: Border prices have been converted at official exchange rates.

Sources: FAO Commodity Review and Outlook (1981-82), FAO Food Outlook (various issues), World Bank(1986) and data collected from the sudy countries.

Table 12. *Real border equivalent producer prices for milk in the study countries, 1971–86.*

Year	Mali	Sudan	Zimbabwe
	CFA/kg	Pound/kg	Cents/kg
1971	201.74	0.40	21.00
1972	209.86	0.44	24.83
1973	180.41	0.45	24.95
1974	201.74	0.42	26.93
1975	162.32	0.37	22.30
1976	127.11	0.30	14.73
1977	117.49	0.29	14.51
1978	97.68	0.26	15.73
1979	127.39	0.25	19.10
1980	131.63	0.27	23.05
1981	136.66	0.24	20.74
1982	141.57	0.25	18.75
1983	140.71	0.23	18.67
1984	137.22	0.17	17.27
1985	128.60	0.17	18.98
1986	109.62	0.15	16.78

Note: (i) Border prices have been converted at official exchange rates.

(ii) The consumer price indices used to deflate nominal border prices have 1980 as the base year, thus, all prices in the table are in terms of 1980 values.

Sources: Same as Table 11 and ILO (1981,1988), IMF (1987).

Table 13. *Nominal consumer prices for beef in the study countries, 1970–86.*

Year	Côte d'Ivoire CFA/kg	Mali CFA/kg	Nigeria Naira/kg	Sudan Pound/kg	Zimbabwe Cents/kg
1970	177	138	0.66	0.17	44.00
1971	178	138	0.71	0.17	44.00
1972	190	138	0.75	0.17	44.00
1973	215	138	0.74	0.26	65.00
1974	247	150	1.18	0.30	73.00
1975	307	300	2.03	0.50	79.00
1976	345	300	2.76	0.46	87.00
1977	441	325	2.84	0.59	90.00
1978	539	400	3.14	0.30	95.00
1979	550	425	3.58	1.26	80.00
1980	650	500	3.76	1.66	86.00
1981	800	550	3.97	2.28	114.00
1982	900	575	4.71	2.57	114.00
1983	900	600	5.61	3.60	125.00
1984	900	600	6.70	4.17	125.00
1985	950	650	6.60	5.29	132.00
1986	950	687	9.50	10.08	151.00

Sources: Côte d'Ivoire - Ministère de la Production Animale (1983) and SODEPRA (personal communication)

Mali - OMBEVI Statistiques du bétail et de la viande (various issues)
Nigeria - Nig. Livestock Information Service (various issues) and FLD (computer printouts)
Sudan - LMMC (computer printouts)
Zimbabwe - Agricultural Marketing Authority (personal communication)

Table 14. *Real consumer prices for beef in the study countries, 1970–86.*

Year	Côte d'Ivoire	Mali	Nigeria	Sudan	Zimbabwe
	CFA/kg	CFA/kg	Naira/kg	Pound/kg	Cents/kg
1970	548.16	526.21	2.77	0.82	90.91
1971	559.75	435.95	2.57	0.81	88.18
1972	595.42	404.77	2.64	0.71	85.77
1973	606.66	313.21	2.47	0.95	122.87
1974	593.89	334.75	3.49	0.87	129.43
1975	662.35	632.24	4.50	1.17	127.21
1976	664.10	585.14	5.01	1.06	126.27
1977	666.36	507.02	4.25	1.16	118.42
1978	720.68	468.38	3.86	0.49	118.31
1979	630.66	518.93	3.94	1.58	84.30
1980	650.00	500.00	3.76	1.66	86.00
1981	735.09	490.20	3.29	1.83	100.71
1982	770.48	500.87	3.62	1.64	91.05
1983	727.68	475.81	3.50	1.76	81.12
1984	697.73	422.53	2.99	1.52	67.49
1985	723.15	423.73	2.79	1.33	65.70
1986	678.04	468.62	3.98	2.05	65.74

Note: The consumer price indices used to deflate actual prices have 1980 as the base year, thus, all prices in the table are in terms of 1980 values.

Sources: Same as Table 13 and ILO (1981,1988), IMF (1987)

Table 15. *Border equivalent consumer prices for beef in the study countries, 1970–86.*

Year	Côte d'Ivoire	Mali	Nigeria	Sudan	Zimbabwe
	CFA/kg	CFA/kg	Naira/kg	Pound/kg	Cents/kg
1970	281.92	137.02	0.73	0.28	36.11
1971	327.42	181.43	0.86	0.33	45.99
1972	371.00	225.93	0.99	0.42	57.69
1973	451.78	273.03	1.33	0.55	79.61
1974	575.82	341.01	1.60	0.65	97.39
1975	295.34	117.47	1.59	0.36	44.08

1976	344.77	139.00	1.97	0.38	51.97
1977	442.83	191.66	2.21	0.48	65.69
1978	427.22	183.87	2.33	0.53	70.94
1979	602.24	259.60	2.95	0.92	96.51
1980	650.95	275.13	2.99	1.16	97.10
1981	715.36	268.87	3.04	1.09	97.98
1982	902.15	381.01	3.62	1.88	93.80
1983	1017.69	447.65	4.11	2.52	118.57
1984	1253.57	580.21	4.88	2.79	173.18
1985	1314.83	609.92	5.21	4.81	242.11
1986	1225.35	541.93	8.23	6.26	308.96

Note: Border prices have been converted at official exchange rates

Sources: IMF (1987), World Bank (1986) and data collected from study countries.

Table 16. *Nominal consumer prices for mutton in the study countries, 1970–86.*

Year	Côte d'Ivoire	Mali	Nigeria	Sudan
	CFA/kg	CFA/kg	Naira/kg	Pound/kg
1970	275	150	0.65	0.29
1971	300	150	0.70	0.29
1972	360	150	0.74	0.29
1973	360	150	0.75	0.38
1974	360	250	0.98	0.41
1975	400	325	1.63	0.70
1976	400	375	2.00	0.63
1977	500	425	2.39	0.79
1978	600	500	2.55	0.43
1979	650	600	2.91	1.74
1980	700	700	3.17	2.75
1981	900	750	3.49	3.33
1982	1100	775	3.97	4.03
1983	1100	800	5.08	5.67
1984	1300	755	5.65	6.57
1985	1300	785	6.59	8.34
1986	1350	940	8.11	14.73

Sources: Côte d'Ivoire - Ministère de la Production Animale (1983) and SODEPRA (personal communication)

Mali - OMBEVI. Statistiques du bétail et de la viande (various issues)
Nigeria - Nig. Livestock Information Service (various issues) and FLD (computer printouts)
Sudan - LMMC (computer printouts)

Table 17. *Real consumer prices for mutton in the study countries, 1970–86.*

Year	Côte d'Ivoire	Mali	Nigeria	Sudan
	CFA/kg	CFA/kg	Naira/kg	Pound/kg
1970	851.66	574.05	2.73	1.40
1971	943.40	475.59	2.53	1.38
1972	1128.17	441.57	2.61	1.22
1973	1015.80	341.69	2.50	1.39
1974	865.59	557.91	2.90	1.18
1975	863.00	684.93	3.61	1.63
1976	769.97	731.42	3.63	1.44
1977	755.51	663.03	3.57	1.55
1978	802.25	585.48	3.13	0.71
1979	745.33	732.60	3.20	2.18
1980	700.00	700.00	3.17	2.75
1981	826.98	668.45	2.89	2.67
1982	941.70	675.09	3.05	2.57
1983	889.39	634.42	3.17	2.77
1984	1007.83	531.69	2.52	2.40
1985	989.57	511.73	2.79	2.09
1986	963.53	641.20	3.40	2.99

Note: The consumer price indices used to deflate actual prices have 1980 as the base year, thus, all prices in the table are in terms of 1980 values.

Sources: Same as Table 16 and ILO (1981, 1988), IMF (1987).

Table 18. *Border equivalent consumer prices for mutton in the study countries, 1970–86.*

Year	Côte d'Ivoire	Mali	Nigeria	Sudan
	CFA/kg	CFA/kg	Naira/kg	Pound/kg
1970	290.45	241.23	0.76	0.32
1971	308.47	271.57	0.82	0.34
1972	356.89	324.48	0.96	0.44
1973	415.50	391.82	1.23	0.54
1974	472.86	431.71	1.31	0.58
1975	445.30	394.44	1.86	0.65
1976	521.01	460.21	2.12	0.68
1977	595.04	515.16	2.44	0.76
1978	687.95	623.51	2.84	1.02
1979	721.29	610.92	3.02	1.27
1980	848.68	734.25	3.28	1.75
1981	1034.23	916.43	3.60	1.86
1982	1103.39	965.72	3.76	2.69
1983	1075.89	939.20	4.32	3.03
1984	1239.09	1117.41	4.76	3.33
1985	1235.17	1128.76	5.49	4.96
1986	1097.72	950.33	7.63	6.13

Note: Border prices have been converted at official exchange rates

Sources: IMF (1987), World Bank (1986) and data collected from study countries.

Table 19. *Nominal consumer prices for milk in the study countries, 1972–86.*

Year	Mali	Nigeria	Sudan	Zimbabwe
	CFA/kg	Naira/kg	Pound/kg	Cents/kg
1972	70	0.51	0.15	14.08
1973	70	0.59	0.15	14.08
1974	70	0.67	0.15	15.83
1975	70	0.94	0.19	15.83
1976	70	0.96	0.19	19.35
1977	70	1.10	0.19	20.00
1978	75	1.34	0.19	20.00
1979	75	1.42	0.19	23.33
1980	75	1.34	0.44	26.67
1981	75	1.21	0.44	26.67
1982	110	1.48	0.44	26.67
1983	110	1.18	0.78	26.67
1984	110	5.88	0.87	40.00
1985	110	6.00	1.07	50.00
1986	148	7.64	1.26	60.00

Sources: Mali - ULB (personal communication)

Nigeria - Federal Ministry of Agriculture (1987) and FLD (personal communication)

Sudan - Animal Production Corporation (personal communication)

Zimbabwe - Agric. Marketing Authority (1986) and DMB. Report and accounts (various issues).

Table 20. *Real consumer prices for milk in the study countries, 1972–86.*

Year	Mali	Nigeria	Sudan	Zimbabwe
	CFA/kg	Naira/kg	Pound/kg	Cents/kg
1972	206.06	1.80	0.63	27.45
1973	159.45	1.97	0.55	26.62
1974	156.21	1.98	0.43	28.07
1975	147.52	2.08	0.44	25.49
1976	136.53	1.74	0.44	28.08
1977	109.20	1.64	0.37	26.32
1978	87.82	1.65	0.31	24.91
1979	91.57	1.56	0.24	24.58
1980	75.00	1.34	0.44	26.67
1981	66.84	1.00	0.35	23.56
1982	95.82	1.14	0.28	21.30
1983	87.23	0.74	0.38	17.31
1984	77.46	2.63	0.32	21.60
1985	71.71	2.54	0.27	24.89
1986	100.95	3.20	0.26	26.12

Note: The consumer price indices used to deflate nominal prices have 1980 as the base year, thus, all prices in the table are in terms of 1980 values.

Sources: Same as Table 19 and ILO (1981,1988), IMF (1987).

Table 21. *Border equivalent consumer prices for milk in the study countries, 1972–86.*

Year	Mali	Nigeria	Sudan	Zimbabwe
	CFA/kg	Naira/kg	Pound/kg	Cents/kg
1972	85.69	0.46	0.12	15.68
1973	93.56	0.53	0.14	16.21
1974	104.79	0.52	0.17	18.40
1975	91.36	0.60	0.18	17.39
1976	79.55	0.40	0.15	14.09
1977	89.70	0.42	0.17	15.37
1978	98.78	0.50	0.19	17.24
1979	119.84	0.62	0.24	23.00

1980	147.14	0.81	0.34	28.61
1981	168.98	0.83	0.38	29.96
1982	185.31	0.83	0.47	32.27
1983	200.35	0.74	0.55	39.66
1984	217.90	1.70	0.58	43.22
1985	220.35	1.82	0.78	48.05
1986	191.14	2.49	0.86	49.23

Note: Border prices have been converted at official exchange rates.

Sources: FAO Commodity Review and Outlook (1981-82), FAO Food Outlook (various issues), World Bank (1986) and data collected from the study countries.

Table 22. *Nominal protection coefficients for beef producers in the study countries, 1970–86.*

Year	Côte d'Ivoire	Mali	Nigeria	Sudan	Zimbabwe
1970	1.11	1.49	1.69	1.44	3.39
1971	0.95	1.30	1.49	1.25	2.30
1972	0.91	1.22	1.37	0.86	1.69
1973	0.81	1.10	1.17	0.66	1.32
1974	0.69	0.91	1.39	0.68	1.18
1975	2.43	3.14	2.48	4.94	4.62
1976	2.46	2.61	2.62	4.45	3.25
1977	1.96	2.39	2.73	3.87	2.16
1978	2.95	3.10	2.69	3.88	1.86
1979	1.83	2.56	2.35	5.25	1.38
1980	2.15	3.11	2.36	4.49	1.99
1981	2.04	2.62	2.70	4.27	2.39
1982	1.52	1.69	2.37	4.04	3.71
1983	1.31	1.47	2.54	3.84	2.93
1984	0.83	0.88	2.44	2.16	1.72
1985	0.91	0.90	2.19	2.10	0.88
1986	1.16	1.47	2.18	4.78	0.99

Source: Estimated from data collected from the study countries by the author.

Table 23. *Nominal protection coefficients for mutton producers in the study countries, 1970–86.*

Year	Côte d'Ivoire	Nigeria	Sudan
1970	0.98	2.42	2.92
1971	1.03	2.47	2.71
1972	0.90	2.16	1.55
1973	0.81	1.34	1.18
1974	0.77	2.38	1.73
1975	0.95	2.80	3.69
1976	1.26	3.60	2.83
1977	1.43	3.75	3.84
1978	1.64	3.33	2.38
1979	1.84	3.42	4.70
1980	1.72	3.16	3.07
1981	1.41	2.83	4.48
1982	1.39	3.17	3.15
1983	1.61	4.92	4.39
1984	1.34	4.60	4.77
1985	1.36	3.81	3.41
1986	1.80	3.97	5.35

Source: Estimated from data collected from the study countries by the author.

Table 24. *Nominal protection coefficients for milk producers in the study countries, 1971–86.*

Year	Mali	Sudan	Zimbabwe
1971	0.38	0.56	0.63
1972	0.34	0.46	0.53
1973	0.46	0.49	0.54
1974	0.40	0.41	0.48
1975	0.47	0.64	0.63
1976	0.67	0.78	1.02
1977	0.58	0.68	0.92
1978	0.65	0.63	0.80
1979	0.60	0.50	0.71

1980	0.48	1.08	0.67
1981	0.47	0.97	0.87
1982	0.66	0.75	1.07
1983	0.57	1.24	1.06
1984	1.04	1.24	1.04
1985	1.17	1.29	1.00
1986	1.44	1.42	1.06

Source: Estimated from data collected from the study countries by the author.

Table 25. *Nominal protection coefficients for beef consumers in the study countries 1970–86.*

Year	Côte d'Ivoire	Mali	Nigeria	Sudan	Zimbabwe
1970	0.63	1.00	0.90	0.61	1.22
1971	0.54	0.76	0.82	0.52	0.96
1972	0.51	0.61	0.75	0.41	0.76
1973	0.48	0.50	0.56	0.47	0.82
1974	0.43	0.44	0.74	0.46	0.75
1975	1.04	2.55	1.28	1.40	1.79
1976	1.00	2.16	1.40	1.23	1.67
1977	1.00	1.70	1.29	1.24	1.37
1978	1.26	2.17	1.35	0.57	1.34
1979	0.91	1.64	1.21	1.37	0.83
1980	1.00	1.82	1.26	1.43	0.89
1981	1.12	2.05	1.30	2.09	1.16
1982	1.00	1.51	1.30	1.37	1.22
1983	0.88	1.34	1.36	1.43	1.05
1984	0.72	1.03	1.37	1.49	0.72
1985	0.72	1.07	1.27	1.10	0.55
1986	0.77	1.27	1.15	1.61	0.49

Source: Estimated from data collected from the study countries by the author

Table 26. *Nominal protection coefficients for mutton consumers in the study countries, 1970–86.*

Year	Côte d'Ivoire	Mali	Nigeria	Sudan
1970	0.95	0.62	0.86	0.90
1971	0.97	0.55	0.85	0.85
1972	1.01	0.46	0.77	0.66
1973	0.87	0.38	0.61	0.70
1974	0.76	0.58	0.75	0.71
1975	0.90	0.82	0.88	1.08
1976	0.77	0.81	0.94	0.93
1977	0.84	0.82	0.98	1.04
1978	0.87	0.80	0.90	0.42
1979	0.90	0.98	0.96	1.37
1980	0.82	0.95	0.97	1.57
1981	0.87	0.82	0.97	1.80
1982	1.00	0.80	1.06	1.50
1983	1.02	0.85	1.18	1.87
1984	1.05	0.68	1.19	1.97
1985	1.05	0.70	1.20	1.68
1986	1.23	0.99	1.06	2.40

Source: Estimated from data collected from the study countries by the author.

Table 27. *Nominal protection coefficients for milk consumers in the study countries, 1972–86.*

Year	Mali	Nigeria	Sudan	Zimbabwe
1972	0.82	1.11	1.25	0.90
1973	0.75	1.11	1.07	0.87
1974	0.67	1.29	0.88	0.86
1975	0.77	1.57	1.06	0.91
1976	0.88	2.40	1.27	1.37
1977	0.78	2.62	1.12	1.30
1978	0.76	2.68	1.00	1.16
1979	0.63	2.29	0.79	1.01
1980	0.51	1.65	1.29	0.93
1981	0.44	1.46	1.16	0.89

1982	0.59	1.78	0.94	0.83
1983	0.55	1.59	1.42	0.67
1984	0.50	3.46	1.50	0.93
1985	0.50	3.30	1.37	1.04
1986	0.77	3.07	1.47	1.22

Note: The milk considered here is evaporated and condensed milk in the case of Nigeria, while for the rest of the countries it is reconstituted milk.

Source: Estimated from data collected from the study countries by the author.

Table 28. *Official exchange rates in the study countries, 1970–86.*

Year	Côte d'Ivoire	Mali	Nigeria	Sudan	Zimbabwe
	$/CFA 1000	$/CFA 1000	$/N1	$/PD1	S/Z$1
1970	3.601	3.601	1.400	2.872	1.400
1971	3.610	3.610	1.403	2.872	1.404
1972	3.965	3.965	1.520	2.872	1.516
1973	4.506	4.506	1.520	2.872	1.707
1974	4.160	4.160	1.590	2.872	1.695
1975	4.670	4.670	1.625	2.872	1.760
1976	4.191	4.191	1.596	2.872	1.598
1977	4.070	4.070	1.551	2.872	1.592
1978	4.440	4.440	1.575	2.662	1.476
1979	4.703	4.703	1.659	2.354	1.471
1980	4.740	4.740	1.830	2.000	1.556
1981	3.701	3.701	1.629	1.869	1.452
1982	3.060	3.060	1.485	1.066	1.321
1983	2.637	2.637	1.382	0.769	0.990
1984	2.296	2.296	1.308	0.769	0.804
1985	2.245	2.245	1.121	0.437	0.620
1986	2.893	2.893	0.743	0.400	0.601

Source: IMF (1987).

Table 29. *Consumer price indices in the study countries, 1970-86*[a].

Year	Côte d'Ivoire	Mali	Nigeria	Sudan	Zimbabwe
1970	32.29	26.13	23.81	20.70	48.40
1971	31.80	31.54	27.65	21.00	49.90
1972	31.91	33.97	28.40	23.80	51.30
1973	35.44	43.90	30.01	27.40	52.90
1974	41.59	44.81	33.77	34.60	56.40
1975	46.35	47.45	45.12	42.90	62.10
1976	51.95	51.27	55.07	43.60	68.90
1977	66.18	64.10	66.88	51.00	76.00
1978	74.79	85.40	81.40	60.80	80.30
1979	87.21	81.90	90.93	79.80	94.90
1980	100.00	100.00	100.00	100.00	100.00
1981	108.83	112.20	120.81	124.60	113.20
1982	116.81	114.80	130.11	156.60	125.20
1983	123.68	126.10	160.31	204.50	154.10
1984	128.99	142.00	223.77	274.30	185.20
1985	131.37	153.40	236.13	398.80	200.90
1986	140.11	146.60	238.65	492.00	229.70

1980 = 100

a. Food price index in the case of Mali.

Source: ILO (1981 and 1988), IMF (1987).